



EVS TOOLROOM LATHE w/DRO

MODEL SB1059F 18" X 40"

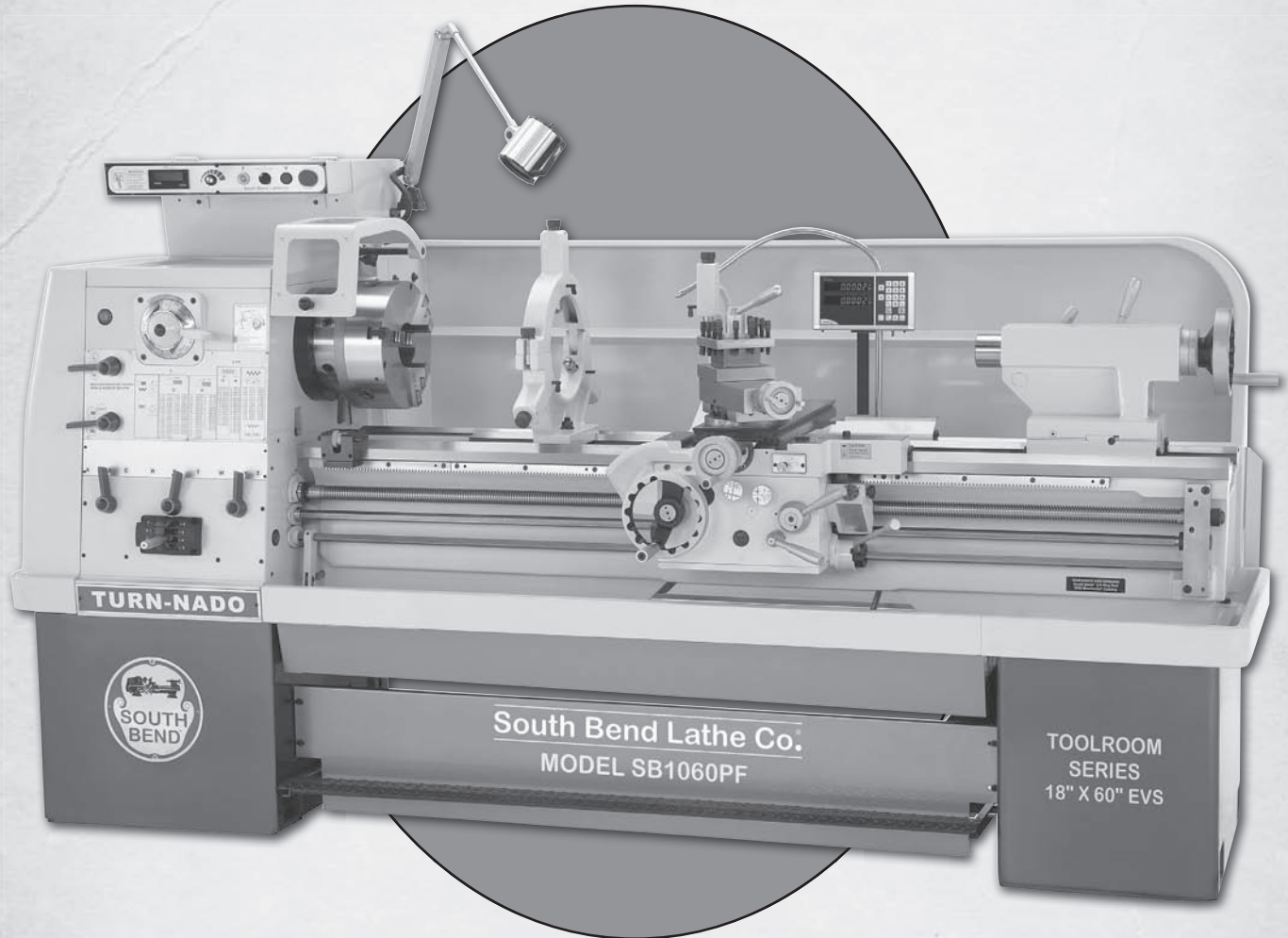
MODEL SB1060PF 18" X 60"

MODEL SB1061PF 18" X 80"

MODEL SB1042PF 21" X 60"

MODEL SB1043PF 21" X 80"

MODEL SB1045PF 21" X 120"



OWNER'S MANUAL

South Bend Lathe Co.™

Hundreds of Thousands of Lathes Sold With a Tradition of Quality Since 1906!



Scope of Manual

This manual helps the reader understand the machine, how to prepare it for operation, how to control it during operation, and how to keep it in good working condition. We assume the reader has a basic understanding of how to operate this type of machine, but that the reader is not familiar with the controls and adjustments of this specific model. As with all machinery of this nature, learning the nuances of operation is a process that happens through training and experience. If you are not an experienced operator of this type of machinery, read through this entire manual, then learn more from an experienced operator, schooling, or research before attempting operations. Following this advice will help you avoid serious personal injury and get the best results from your work.

Manual Feedback

We've made every effort to be accurate when documenting this machine. However, errors sometimes happen or the machine design changes after the documentation process—so the manual may not exactly match your machine. If a difference between the manual and machine leaves you in doubt, contact our customer service for clarification.

We highly value customer feedback on our manuals. If you have a moment, please share your experience using this manual. What did you like about it? Is there anything you would change to make it better? Did it meet your expectations for clarity, professionalism, and ease-of-use?

South Bend Lathe, Inc.
c/o Technical Documentation Manager
P.O. Box 2027
Bellingham, WA 98227
Email: manuals@southbendlathe.com

Updates

For your convenience, any updates to this manual will be available to download free of charge through our website at:

www.southbendlathe.com

Customer Service

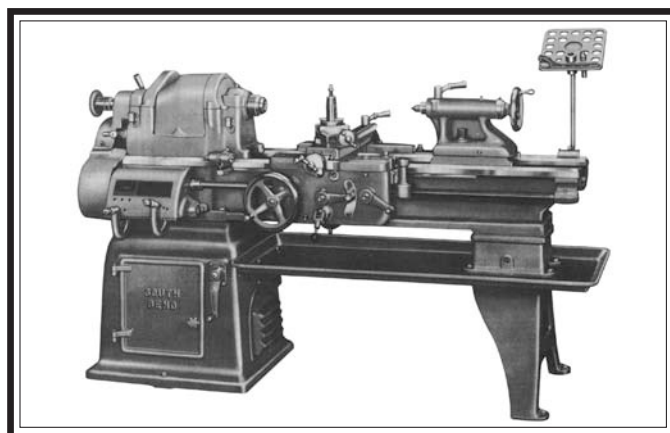
We stand behind our machines. If you have any service questions, parts requests or general questions about your purchase, feel free to contact us.

South Bend Lathe Co.
P.O. Box 2027
Bellingham, WA 98227
Fax: (360) 676-1075 (International)
Fax: (360) 734-1639 (USA Only)
Email: sales@southbendlathe.com

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16" South Bend Precision Toolroom Lathe
(Circa 1958)

About This Machine

Foreword

"The screw cutting engine lathe is the oldest and most important of machine tools and from it all other machine tools have been developed. It was the lathe that made possible the building of the steamboat, the locomotive, the electric motor, the automobile and all kinds of machinery used in industry. Without the lathe our great industrial progress of the last century would have been impossible." —**How To Run a Lathe**, 15th Edition, South Bend Lathe.

The lathe represented in this manual is a modern day version of the screw cutting lathes that trace their roots back to the 1700's, which were themselves technological improvements of the bow lathe that can be traced back thousands of years to the ancient Egyptians.

Now, almost 300 years later, these modern "screw cutting" lathes are not just a piece of refined machinery, but a culmination of human ingenuity and knowledge embodied into the design and synergy of thousands of interworking parts—some of which represent the life's work and dreams of many inventors, mechanical engineers, and world-class machinists—including the likes of Leonardo da Vinci, Henry Maudsley, and the founders of South Bend Lathe, John and Miles O'Brien.

And now the torch is passed to you—to take the oldest and most important type of machine tool—and carry on the tradition. As the operator of a South Bend Lathe, you now join the ranks of some very famous and important customers, such as Henry Ford, who used the machines he purchased to help him change the world.

Capabilities

These EVS Toolroom Lathes are built for daily use in a busy industrial setting. Loaded with many nice features and high-precision parts, these lathes excel at making fine tools, dies, thread gauges, jigs, and precision test gauges—however, they are by no means delicate. Thick castings, heavy weight, and quality construction throughout provide the necessary brawn for demanding production and manufacturing tasks.

Features

As the name implies, these lathes feature EVS (Electronic Variable Speed) spindle control, that allows the operator to quickly adjust the spindle speed. One of four spindle speed ranges is selected with the speed range lever, then the exact speed within that range is chosen with the spindle speed dial. The current spindle speed is displayed with the digital tachometer on the control panel.

The beds of these lathes are constructed with Meehanite castings that are hardened and precision-ground in the traditional 3-V-way prismatic design—long used on South Bend Lathes for its accuracy, durability, and rigidity.

The headstock features quick-change gear levers and the carriage includes an adjustable clutch that disables automatic carriage feed when it contacts the included feed stop or in the event of a crash..

To further ensure a high degree of accuracy, these lathes are equipped with high-quality spindle bearings and a Fagor 2-Axis DRO. The spindles are D1-8 camlock with an MT#7 taper and 3.15" bore. The tailstock quills have an MT#5 taper and offer 6.5" of travel.

The headstock is equipped with a pressurized oiling system that pre-lubricates the bearings and gears before the spindle starts. This guarantees that the headstock is properly lubricated in all start-up conditions, including high-load/low-speed operations.

Finally, these EVS toolroom lathes are packed with a premium Yaskawa Inverter, Allen-Bradley contactors, thermal relays, and fuse system. Also included are a complete coolant system, an easy-to-clean chip drawer, one-shot way lubrication system, ball bearing steady rest and brass-tipped follow rest, adjustable work lamp, foot brake, and automatic feeding capabilities for both the X- and Y-axis.

General Identification

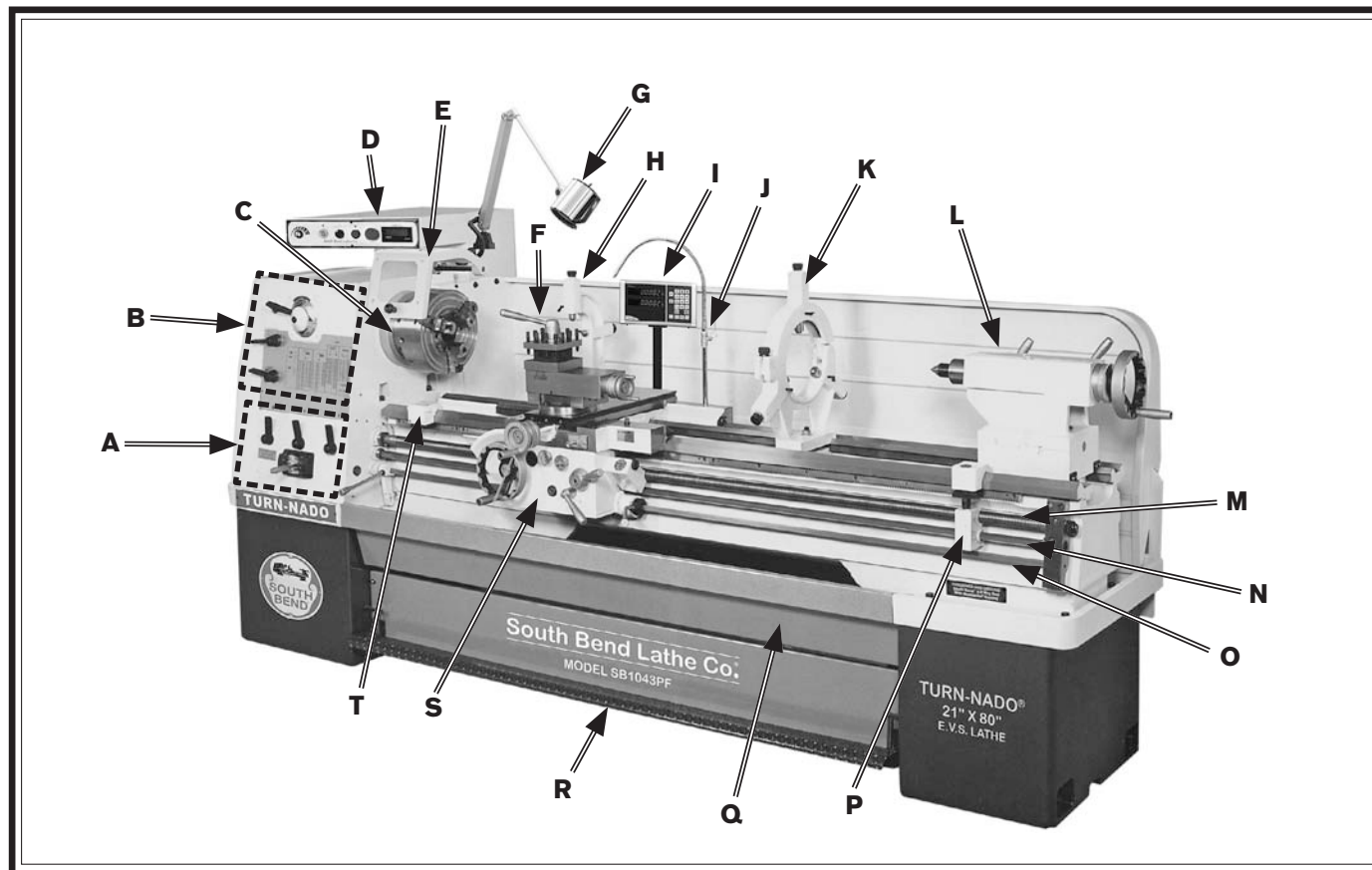


Figure 1. General identification (Model SB1060PF shown).

- | | |
|-----------------------------------------|---------------------------------------------------|
| A. Quick-Change Gearbox Controls | K. Steady Rest |
| B. Headstock Controls | L. Tailstock w/MT#5 Quill |
| C. D1-8 Camlock MT#7 Spindle | M. Leadscrew |
| D. EVS Control Panel | N. Feed Rod |
| E. Chuck Guard w/Safety Switch | O. Spindle Rod |
| F. 4-Way Tool Post | P. Rod Support (SB1043PF/-45PF/-61PF only) |
| G. Halogen Work Lamp | Q. Chip Drawer |
| H. Follow Rest | R. Brake Pedal |
| I. Fagor DRO Control Panel | S. Carriage |
| J. Coolant Nozzle & Valve | T. Micrometer Stop |

⚠️ WARNING

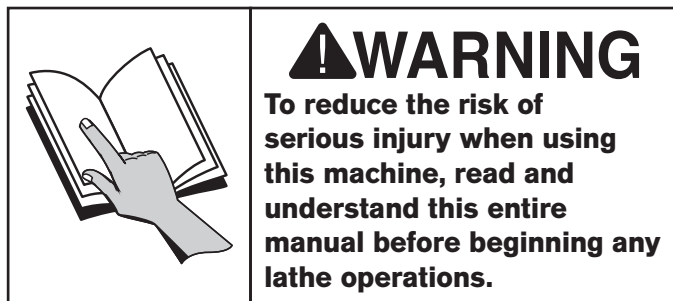
Serious personal injury could occur if you connect the machine to power before completing the setup process. **DO NOT** connect power until instructed to do so later in this manual.

⚠️ WARNING

Untrained users have an increased risk of seriously injuring themselves with this machine. Do not operate this machine until you have understood this entire manual and received proper training.

Controls & Components

Refer to **Figures 2–9** and the following descriptions to become familiar with the features and basic controls of this lathe. This knowledge will be necessary to properly set up the lathe for the test run and spindle break-in.



Master Power Switch

The rotary switch shown in **Figure 2** toggles incoming power ON and OFF to the lathe controls. It also prevents the electrical cabinet door from being opened when the switch is **ON**.

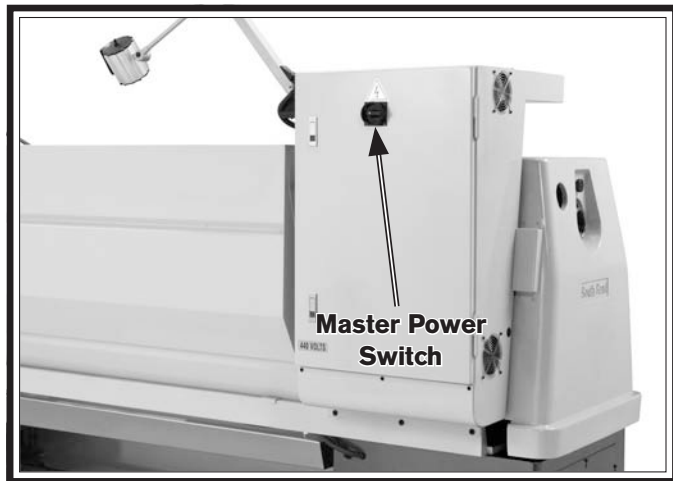


Figure 2. Location of the master power switch.

NOTICE

Turning the master power switch to OFF is not a safe alternative to completely disconnecting the machine from power when wiring, servicing, or making repairs.

Headstock Controls

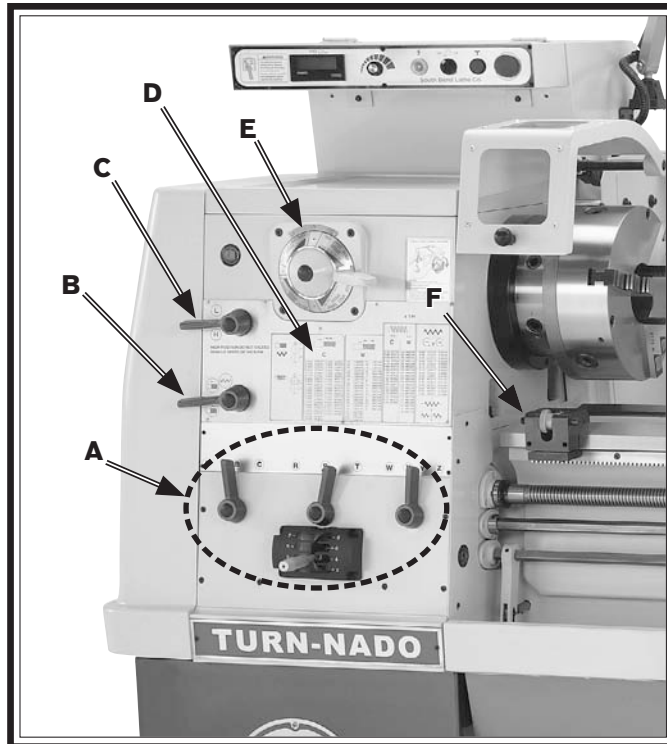


Figure 3. Headstock controls.

- A. Quick Change Gearbox Levers:** Controls the leadscrew and feed rod speed for threading and feed operations.
- B. Headstock Feed Direction Lever:** Controls the direction that the leadscrew and feed rod rotate.
- C. Gearbox Range Lever:** Shifts the quick-change gearbox into low range, neutral, or high range.
- D. Threading and Feed Charts:** Displays the necessary configuration of the gearbox levers and end gears for different threading or feeding options.
- E. Spindle Speed Range Lever:** Selects one of four spindle speed ranges.
- F. Micrometer Stop:** Limits carriage travel for production runs or to make final adjustments to the carriage position.

Control Panel

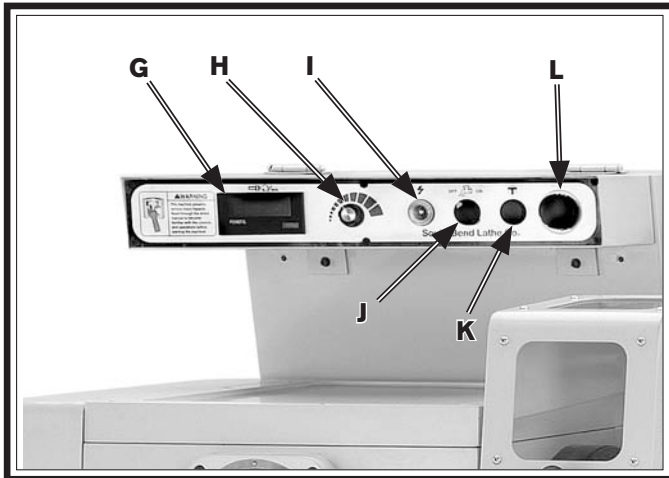


Figure 4. Control panel.

- G. Tachometer Display:** Displays the current spindle speed in RPM.
- H. Spindle Speed Dial:** Electronically varies the spindle speed within the selected spindle speed range.
- I. Power Light:** Illuminates when lathe controls are receiving power.
- J. Coolant Pump Switch:** Controls the coolant pump motor.
- K. Jog Button:** Turns the spindle motor *ON* while being pressed and held.
- L. STOP Button:** Stops all machine functions. Twist clockwise to reset.

Carriage Controls

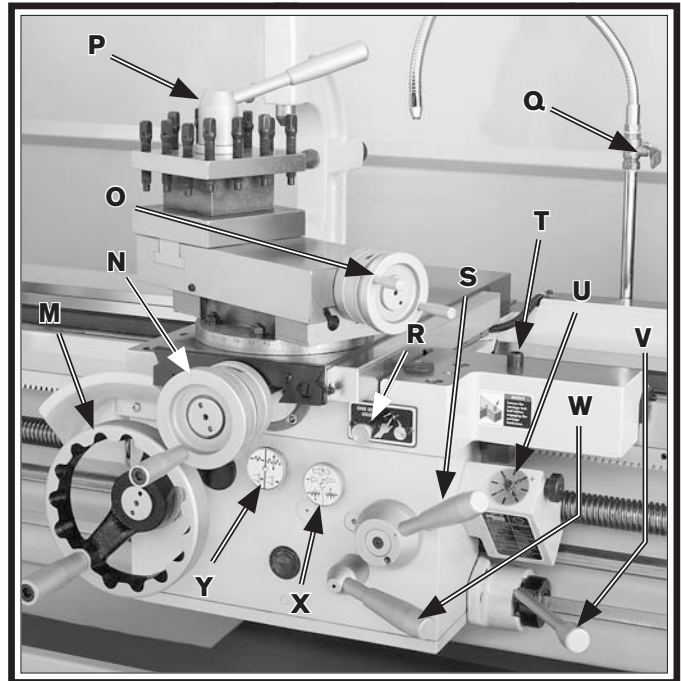


Figure 5. Carriage controls.

- M. Carriage Handwheel:** Moves the carriage along the bed. Can be disengaged during power feed operations to prevent an entanglement hazard.
- N. Cross Slide Handwheel:** Moves the cross slide toward and away from the workpiece.
- O. Compound Rest Handwheel:** Moves the tool toward and away from the workpiece at the preset angle of the compound rest.
- P. 4-Way Tool Post:** Mounts up to four cutting tools at once that can be individually indexed to the workpiece.
- Q. Coolant Flow Control Lever:** Controls the flow of coolant from the nozzle.
- R. One-Shot Oiler:** Draws oil from the apron reservoir to lubricate the carriage ways through various oil ports.
- S. Half Nut Lever:** Engages/disengages the half nut for threading operations.
- T. Carriage Lock:** Secures the carriage in place when the carriage should not move.

- U. Thread Dial and Chart:** Dial indicates when to engage the half nut during threading operations. Chart indicates on which thread dial reading to engage the half nut for specific inch thread pitches.
- V. Spindle ON/OFF Lever:** Starts, stops and reverses direction of spindle rotation.
- W. Feed ON/OFF Lever:** Engages/disengages power feed.
- X. Apron Feed Direction Knob:** Changes direction of carriage or the cross slide feed without having to stop the lathe and move the headstock feed direction lever.
- Y. Feed Selection Knob:** Selects the carriage or cross slide for power feed.

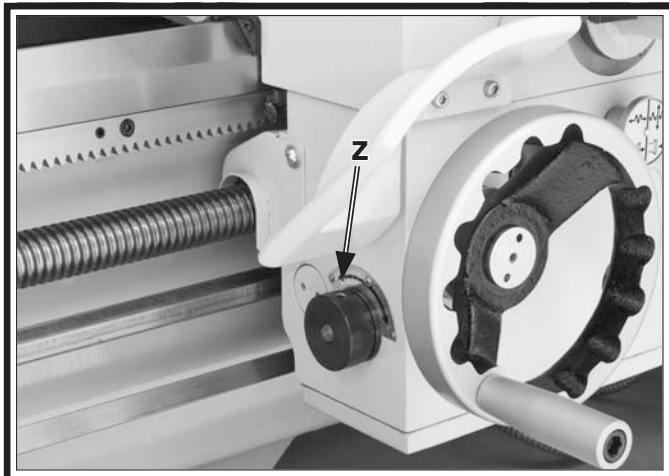


Figure 6. Adjustable carriage clutch knob.

- Z. Carriage Clutch Knob:** Adjusts how easily the carriage clutch will disengage automatic feeding when the carriage contacts a feed stop or in the event of a crash. Tightening this knob all the way disables the carriage clutch completely.

Tailstock Controls

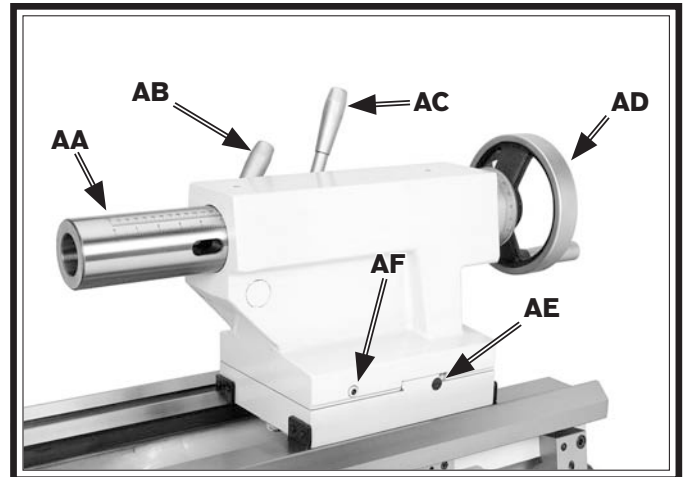


Figure 7. Tailstock controls.

- AA. Quill:** The quill has an MT#5 taper, metric and inch scale, and a drift slot to remove tight-fitting tooling.
- AB. Quill Lock Lever:** Secures the quill in position.
- AC. Tailstock Lock Lever:** Secures the tailstock in position along the bedway.
- AD. Tailstock Handwheel:** Moves the quill toward or away from the spindle. The graduated dial has 0.001" increments with one full revolution equaling 0.200" of quill travel.
- AE. Tailstock Gib Screws:** Adjust the tapered gib to control tailstock offset accuracy.
- AF. Tailstock Offset Screws:** Adjust the tailstock offset left or right from the spindle centerline.

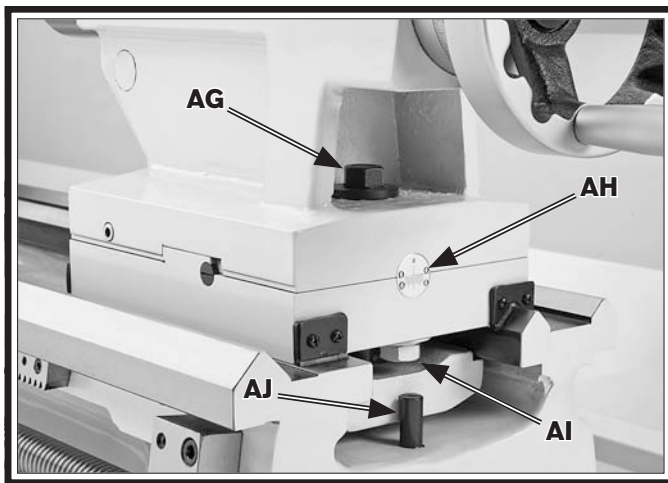


Figure 8. Tailstock controls.

- AG. Tailstock Clamp Bolt:** Adjusts the clamping pressure applied by the tailstock lock lever.
- AH. Offset Scale:** Indicates the relative distance of tailstock offset from the spindle centerline.
- AI. Offset Lock Bolt:** Clamps together the upper and lower halves of the tailstock after the offset is adjusted.
- AJ. Tailstock Stop Pin:** Prevents the tailstock from sliding off of the ways.

Foot Brake

This lathe is equipped with a foot brake (see **Figure 9**) to quickly stop the spindle instead of allowing it to coast to a stop on its own. Pressing the foot brake while the spindle is **ON** also cuts power to the motor.

After the foot brake is used, the spindle ON/OFF lever must be returned to the OFF (middle) position to reset the spindle switches before spindle rotation can be re-started.

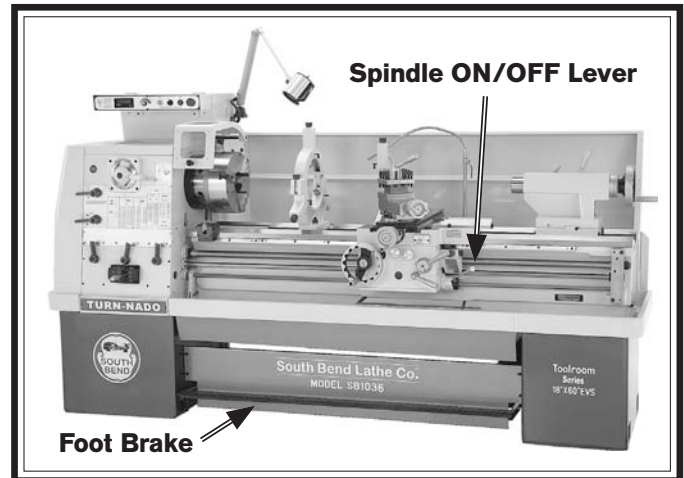


Figure 9. Foot brake and spindle ON/OFF lever.



Product Specifications

P.O. Box 2027, Bellingham, WA 98227 U.S.A.
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MODEL SB1059F, SB1060PF, SB1061PF 18" EVS TOOLROOM LATHE w/DRO

Model Number	SB1059F	SB1060PF	SB1061PF
Product Dimensions			
Weight	4400 lbs.	5170 lbs.	5940 lbs.
Width (side-to-side)/Depth (front-to-back)/Height	90¾" x 27" x 62¼"	110½" x 27" x 62¼"	130¼" x 27" x 62¼"
Foot Print (Width/Depth)	102½" x 71¾"	122¼" x 71¾"	142" x 71¾"
Shipping Dimensions			
Type	Wood Slat Crate	Wood Slat Crate	Wood Slat Crate
Weight	4708 lbs.	5522 lbs.	6380 lbs.
Width (side-to-side)/Depth (front-to-back)/Height	100" x 45" x 73"	121" x 45" x 73"	141" x 45" x 73"
Electrical			
Power Requirement	440V, 3-Phase, 60Hz	440V, 3-Phase, 60 Hz	440V, 3-Phase, 60 Hz
Full-Load Current Rating	16.83A	18.83A	18.83A
Minimum Circuit Size	30A	30A	30A
Inverter Type	Yaskawa G7A4011	Yaskawa G7A4011	Yaskawa G7A4011
Switch	Magnetic with Thermal Protection	Magnetic with Thermal Protection	Magnetic with Thermal Protection
Switch Voltage	440V	440V	440V
Plug Included	No	No	No
Recommended Plug/Outlet Type	Hardwire to Locking Disconnect Switch	Hardwire to Locking Disconnect Switch	Hardwire to Locking Disconnect Switch

Model Number	SB1059F	SB1060PF	SB1061PF
Main Motor			
Type	TEFC Induction	TEFC Induction	TEFC Induction
Horsepower	10 HP	12.5 HP	12.5 HP
Voltage	440V	440V	440V
Phase	3-Phase	3-Phase	3-Phase
Amps	16A	18A	18A
Speed	0–3000 RPM	0–3000 RPM	0–3000 RPM
Cycle	60 Hz	60 Hz	60 Hz
Power Transfer	V-Belt & Gear	V-Belt & Gear	V-Belt & Gear
Bearings	Shielded & Permanently Sealed	Shielded & Permanently Sealed	Shielded & Permanently Sealed
Coolant Motor			
Type	TEFC Induction	TEFC Induction	TEFC Induction
Horsepower	1/8 HP	1/8 HP	1/8 HP
Voltage	440V	440V	440V
Phase	3-Phase	3-Phase	3-Phase
Amps	0.23A	0.23A	0.23A
Speed	3450 RPM	3450 RPM	3450 RPM
Cycle	60 Hz	60 Hz	60 Hz
Power Transfer	Direct Drive	Direct Drive	Direct Drive
Bearings	Shielded & Permanently Sealed	Shielded & Permanently Sealed	Shielded & Permanently Sealed
Lubrication Motor			
Type	TEFC Induction	TEFC Induction	TEFC Induction
Horsepower	1/4 HP	1/4 HP	1/4 HP
Voltage	440V	440V	440V
Phase	3-Phase	3-Phase	3-Phase
Amps	0.6A	0.6A	0.6A
Speed	1720 RPM	1720 RPM	1720 RPM
Cycle	60 Hz	60 Hz	60 Hz
Power Transfer	Direct Drive	Direct Drive	Direct Drive
Bearings	Shielded & Permanently Sealed	Shielded & Permanently Sealed	Shielded & Permanently Sealed
Operation Information			
Swing Over Bed	18.11 in.	18.11 in.	18.11 in.
Distance Between Centers	40 in.	60 in.	80 in.
Swing Over Cross Slide	11.02 in	11.02 in	11.02 in
Swing Over Saddle	18 in.	18 in.	18 in.
Swing Over Gap	27.95 in.	27.95 in.	27.95 in.
Maximum Tool Bit Size	1 in.	1 in.	1 in.
Compound Travel	5.39 in.	5.39 in.	5.39 in.
Carriage Travel	39 in.	59 in.	79 in.
Cross Slide Travel	11 in.	11 in.	11 in.

Model Number	SB1059F	SB1060PF	SB1061PF
Headstock Information			
Spindle Bore	3.15 in.	3.15 in.	3.15 in.
Spindle Taper	MT#7	MT#7	MT#7
Number of Spindle Speeds	Variable	Variable	Variable
Range of Spindle Speeds	18–1800 RPM	18–1800 RPM	18–1800 RPM
Spindle Type	D1-8 Camlock	D1-8 Camlock	D1-8 Camlock
Spindle Bearings	Tapered Roller	Tapered Roller	Tapered Roller
Tailstock Information			
Tailstock Quill Travel	6.5 in.	6.5 in.	6.5 in.
Tailstock Taper	MT#5	MT#5	MT#5
Tailstock Barrel Diameter	3 in.	3 in.	3 in.
Threading Information			
Number of Longitudinal Feeds	15	15	15
Range of Longitudinal Feeds	0.0015–0.0400 in./rev.	0.0015–0.0400 in./rev.	0.0015–0.0400 in./rev.
Number of Cross Feeds	15	15	15
Range of Cross Feeds	0.00075–0.0200 in./rev	0.00075–0.0200 in./rev	0.00075–0.0200 in./rev
Number of Inch Threads	38	38	38
Range of Inch Threads	2–72 TPI	2–72 TPI	2–72 TPI
Number of Metric Threads	40	40	40
Range of Metric Threads	0.4–14 mm	0.4–14 mm	0.4–14 mm
Number of Modular Pitches	18	18	18
Range of Modular Pitches	0.3–3.5 MP	0.3–3.5 MP	0.3–3.5 MP
Number of Diametral Pitches	21	21	21
Range of Diametral Pitches	8–44 DP	8–44 DP	8–44 DP
Dimensions			
Bed Width	13.58 in.	13.58 in.	13.58 in.
Leadscrew Diameter	1 $\frac{3}{8}$ in.	1 $\frac{3}{8}$ in.	1 $\frac{3}{8}$ in.
Leadscrew TPI	4 TPI	4 TPI	4 TPI
Leadscrew Length	65.71 in.	85.39 in.	105.08 in.
Steady Rest Capacity	$\frac{5}{8}$ –7 $\frac{1}{16}$ in.	$\frac{5}{8}$ –7 $\frac{1}{16}$ in.	$\frac{5}{8}$ –7 $\frac{1}{16}$ in.
Follow Rest Capacity	$\frac{5}{8}$ –5 $\frac{1}{8}$ in.	$\frac{5}{8}$ –5 $\frac{1}{8}$ in.	$\frac{5}{8}$ –5 $\frac{1}{8}$ in.
Faceplate Size	14 in.	14 in.	14 in.
Feed Rod Diameter	0.93 in	0.93 in	0.93 in
Floor to Center Height	45.08 in.	45.08 in.	45.08 in.
Height With Leveling Jacks	46.25 in	46.25 in	46.25 in

Model Number	SB1059F	SB1060PF	SB1061PF
Construction			
Headstock	Cast Iron	Cast Iron	Cast Iron
Headstock Gears	Flame-Hardened Steel	Flame-Hardened Steel	Flame-Hardened Steel
Bed	Meehanite Castings with Induction-Hardened Ways	Meehanite Castings with Induction-Hardened Ways	Meehanite Castings with Induction-Hardened Ways
Stand	Cast Iron	Cast Iron	Cast Iron
Paint	Urethane	Urethane	Urethane
Other			
Country of Origin	Taiwan (Some Components Made in USA & Germany)	Taiwan (Some Components Made in USA & Germany)	Taiwan (Some Components Made in USA & Germany)
Warranty	1 Year	1 Year	1 Year
Serial Number Location	ID Label on Front of Headstock	ID Label on Front of Headstock	ID Label on Front of Headstock
Assembly Time	Approximately 1 Hour	Approximately 1 Hour	Approximately 1 Hour
Sound Rating at Idle	69 dB	69 dB	69 dB



Product Specifications

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MODEL SB1042PF, SB1043PF, SB1045PF 21" EVS TOOLROOM LATHE w/DRO

Model Number	SB1042PF	SB1043PF	SB1045PF
Product Dimensions			
Weight	5830 lbs.	6600 lbs.	8140 lbs.
Width (side-to-side)/Depth (front-to-back)/Height	110½" x 27" x 62¼"	130¼" x 27" x 62¼"	169¾" x 27" x 62¼"
Foot Print (Width/Depth)	122" x 71¾"	141¾" x 71¾"	182" x 71¾"
Shipping Dimensions			
Type	Wood Slat Crate	Wood Slat Crate	Wood Slat Crate
Weight	6182 lbs.	7040 lbs.	8712 lbs.
Width (side-to-side)/Depth (front-to-back)/Height	121" x 45" x 73"	141" x 45" x 73"	183" x 45" x 73"
Electrical			
Power Requirement	440V, 3-Phase, 60Hz	440V, 3-Phase, 60 Hz	440V, 3-Phase, 60 Hz
Full-Load Current Rating	18.83A	18.83A	18.83A
Minimum Circuit Size	30A	30A	30A
Inverter Type	Yaskawa G7A4011	Yaskawa G7A4011	Yaskawa G7A4011
Switch	Magnetic with Thermal Protection	Magnetic with Thermal Protection	Magnetic with Thermal Protection
Switch Voltage	440V	440V	440V
Plug Included	No	No	No
Recommended Plug/Outlet Type	Hardwire to Locking Disconnect Switch	Hardwire to Locking Disconnect Switch	Hardwire to Locking Disconnect Switch

Model Number	SB1042PF	SB1043PF	SB1045PF
Main Motor			
Type	TEFC Induction	TEFC Induction	TEFC Induction
Horsepower	12.5 HP	12.5 HP	12.5 HP
Voltage	440V	440V	440V
Phase	3-Phase	3-Phase	3-Phase
Amps	18A	18A	18A
Speed	0–3000 RPM	0–3000 RPM	0–3000 RPM
Cycle	60 Hz	60 Hz	60 Hz
Power Transfer	V-Belt & Gear	V-Belt & Gear	V-Belt & Gear
Bearings	Shielded & Permanently Sealed	Shielded & Permanently Sealed	Shielded & Permanently Sealed
Coolant Motor			
Type	TEFC Induction	TEFC Induction	TEFC Induction
Horsepower	1/8 HP	1/8 HP	1/8 HP
Voltage	440V	440V	440V
Phase	3-Phase	3-Phase	3-Phase
Amps	0.23A	0.23A	0.23A
Speed	3450 RPM	3450 RPM	3450 RPM
Cycle	60 Hz	60 Hz	60 Hz
Power Transfer	Direct Drive	Direct Drive	Direct Drive
Bearings	Shielded & Permanently Sealed	Shielded & Permanently Sealed	Shielded & Permanently Sealed
Lubrication Motor			
Type	TEFC Induction	TEFC Induction	TEFC Induction
Horsepower	1/4 HP	1/4 HP	1/4 HP
Voltage	440V	440V	440V
Phase	3-Phase	3-Phase	3-Phase
Amps	0.6A	0.6A	0.6A
Speed	1720 RPM	1720 RPM	1720 RPM
Cycle	60 Hz	60 Hz	60 Hz
Power Transfer	Direct Drive	Direct Drive	Direct Drive
Bearings	Shielded & Permanently Sealed	Shielded & Permanently Sealed	Shielded & Permanently Sealed
Operation Information			
Swing Over Bed	21 in.	21 in.	21 in.
Distance Between Centers	60 in.	80 in.	120 in.
Swing Over Cross Slide	14.01 in.	14.01 in.	14.01 in.
Swing Over Saddle	21 in.	21 in.	21 in.
Swing Over Gap	31.10 in.	31.10 in.	31.10 in.
Maximum Tool Bit Size	1 in.	1 in.	1 in.
Compound Travel	5.39 in.	5.39 in.	5.39 in.
Carriage Travel	59 in.	79 in.	119 in.
Cross Slide Travel	11 in.	11 in.	11 in.

Model Number	SB1042PF	SB1043PF	SB1045PF
Headstock Information			
Spindle Bore	3.15 in.	3.15 in.	3.15 in.
Spindle Taper	MT#7	MT#7	MT#7
Number of Spindle Speeds	Variable	Variable	Variable
Range of Spindle Speeds	18–1800 RPM	18–1800 RPM	18–1800 RPM
Spindle Type	D1-8 Camlock	D1-8 Camlock	D1-8 Camlock
Spindle Bearings	Tapered Roller	Tapered Roller	Tapered Roller
Tailstock Information			
Tailstock Quill Travel	6.5 in.	6.5 in.	6.5 in.
Tailstock Taper	MT#5	MT#5	MT#5
Tailstock Barrel Diameter	3 in.	3 in.	3 in.
Threading Information			
Number of Longitudinal Feeds	15	15	15
Range of Longitudinal Feeds	0.0015–0.0400 in./rev.	0.0015–0.0400 in./rev.	0.0015–0.0400 in./rev.
Number of Cross Feeds	15	15	15
Range of Cross Feeds	0.00075–0.0200 in./rev	0.00075–0.0200 in./rev	0.00075–0.0200 in./rev
Number of Inch Threads	38	38	38
Range of Inch Threads	2–72 TPI	2–72 TPI	2–72 TPI
Number of Metric Threads	40	40	40
Range of Metric Threads	0.4–14 mm	0.4–14 mm	0.4–14 mm
Number of Modular Pitches	18	18	18
Range of Modular Pitches	0.3–3.5 MP	0.3–3.5 MP	0.3–3.5 MP
Number of Diametral Pitches	21	21	21
Range of Diametral Pitches	8–44 DP	8–44 DP	8–44 DP
Dimensions			
Bed Width	13.58 in.	13.58 in.	13.58 in.
Leadscrew Diameter	1 $\frac{3}{8}$ in.	1 $\frac{3}{8}$ in.	1 $\frac{3}{8}$ in.
Leadscrew TPI	4 TPI	4 TPI	4 TPI
Leadscrew Length	85.39 in.	105.08 in.	145.43 in.
Steady Rest Capacity	$\frac{5}{8}$ –7 $\frac{1}{16}$ in.	$\frac{5}{8}$ –7 $\frac{1}{16}$ in.	$\frac{5}{8}$ –7 $\frac{1}{16}$ in.
Follow Rest Capacity	$\frac{5}{8}$ –5 $\frac{1}{8}$ in.	$\frac{5}{8}$ –5 $\frac{1}{8}$ in.	$\frac{5}{8}$ –5 $\frac{1}{8}$ in.
Faceplate Size	14 in.	14 in.	14 in.
Feed Rod Diameter	0.93 in	0.93 in	0.93 in
Floor to Center Height	46.65 in.	46.65 in.	46.65 in.
Height With Leveling Jacks	47.9 in.	47.9 in.	47.9 in.

Model Number	SB1042PF	SB1043PF	SB1045PF
Construction			
Headstock	Cast Iron	Cast Iron	Cast Iron
Headstock Gears	Flame-Hardened Steel	Flame-Hardened Steel	Flame-Hardened Steel
Bed	Meehanite Castings with Induction-Hardened Ways	Meehanite Castings with Induction-Hardened Ways	Meehanite Castings with Induction-Hardened Ways
Stand	Cast Iron	Cast Iron	Cast Iron
Paint	Urethane	Urethane	Urethane
Other			
Country of Origin	Taiwan (Some Components Made in USA & Germany)	Taiwan (Some Components Made in USA & Germany)	Taiwan (Some Components Made in USA & Germany)
Warranty	1 Year	1 Year	1 Year
Serial Number Location	ID Label on Front of Headstock	ID Label on Front of Headstock	ID Label on Front of Headstock
Assembly Time	Approximately 1 Hour	Approximately 1 Hour	Approximately 1 Hour
Sound Rating at Idle	69 dB	69 dB	69 dB

Understanding Risks of Machinery

Operating all machinery and machining equipment can be dangerous or relatively safe depending on how it is installed and maintained, and the operator's experience, common sense, risk awareness, working conditions, and use of personal protective equipment (safety glasses, respirators, etc.).

The owner of this machinery or equipment is ultimately responsible for its safe use. This responsibility includes proper installation in a safe environment, personnel training and usage authorization, regular inspection and maintenance, manual availability and comprehension, application of safety devices, integrity of cutting tools or accessories, and the usage of approved personal protective equipment by all operators and bystanders.

The manufacturer of this machinery or equipment will not be held liable for injury or property damage from negligence, improper training, machine modifications, or misuse. Failure to read, understand, and follow the manual and safety labels may result in serious personal injury, including amputation, broken bones, electrocution, or death.

The signals used in this manual to identify hazard levels are defined as follows:



Death or catastrophic harm WILL occur.



Moderate injury or fire MAY occur.



Death or catastrophic harm COULD occur.



Machine or property damage may occur.

Basic Machine Safety

Owner's Manual: All machinery and machining equipment presents serious injury hazards to untrained users. To reduce the risk of injury, anyone who uses THIS item MUST read and understand this entire manual before starting.

Personal Protective Equipment: Operating or servicing this item may expose the user to flying debris, dust, smoke, dangerous chemicals, or loud noises. These hazards can result in eye injury, blindness, long-term respiratory damage, poisoning, cancer, reproductive harm or hearing loss. Reduce your risks from these hazards by wearing approved eye protection, respirator, gloves, or hearing protection.

Trained/Supervised Operators Only: Untrained users can seriously injure themselves or bystanders. Only allow trained and properly supervised personnel to operate this item. Make sure safe operation instructions are clearly understood. If electrically powered, use padlocks and master switches, and remove start switch keys to prevent unauthorized use or accidental starting.

Guards/Covers: Accidental contact with moving parts during operation may cause severe entanglement, impact, cutting, or crushing injuries. Reduce this risk by keeping any included guards/covers/doors installed, fully functional, and positioned for maximum protection.

Entanglement: Loose clothing, gloves, neckties, jewelry or long hair may get caught in moving parts, causing entanglement, amputation, crushing, or strangulation. Reduce this risk by removing/securing these items so they cannot contact moving parts.

Mental Alertness: Operating this item with reduced mental alertness increases the risk of accidental injury. Do not let a temporary influence or distraction lead to a permanent disability! Never operate when under the influence of drugs/alcohol, when tired, or otherwise distracted.

Safe Environment: Operating electrically powered equipment in a wet environment may result in electrocution; operating near highly flammable materials may result in a fire or explosion. Only operate this item in a dry location that is free from flammable materials.

Electrical Connection: With electrically powered equipment, improper connections to the power source may result in electrocution or fire. Always adhere to all electrical requirements and applicable codes when connecting to the power source. Have all work inspected by a qualified electrician to minimize risk.

Disconnect Power: Adjusting or servicing electrically powered equipment while it is connected to the power source greatly increases the risk of injury from accidental startup. Always disconnect power **BEFORE** any service or adjustments, including changing blades or other tooling.

Secure Workpiece/Tooling: Loose workpieces, cutting tools, or rotating spindles can become dangerous projectiles if not secured or if they hit another object during operation. Reduce the risk of this hazard by verifying that all fastening devices are properly secured and items attached to spindles have enough clearance to safely rotate.

Chuck Keys or Adjusting Tools: Tools used to adjust spindles, chucks, or any moving/rotating parts will become dangerous projectiles if left in place when the machine is started. Reduce this risk by developing the habit of always removing these tools immediately after using them.

Work Area: Clutter and dark shadows increase the risks of accidental injury. Only operate this item in a clean, non-glaring, and well-lighted work area.

Properly Functioning Equipment: Poorly maintained, damaged, or malfunctioning equipment has higher risks of causing serious personal injury compared to those that are properly maintained. To reduce this risk, always maintain this item to the highest standards and promptly repair/service a damaged or malfunctioning component. Always follow the maintenance instructions included in this documentation.

Unattended Operation: Electrically powered equipment that is left unattended while running cannot be controlled and is dangerous to bystanders. Always turn the power **OFF** before walking away.

Health Hazards: Certain cutting fluids and lubricants, or dust/smoke created when cutting, may contain chemicals known to the State of California to cause cancer, respiratory problems, birth defects, or other reproductive harm. Minimize exposure to these chemicals by wearing approved personal protective equipment and operating in a well ventilated area.

Difficult Operations: Attempting difficult operations with which you are unfamiliar increases the risk of injury. If you experience difficulties performing the intended operation, **STOP!** Seek an alternative method to accomplish the same task, ask a qualified expert how the operation should be performed, or contact our Technical Support for assistance.

Additional Metal Lathe Safety

Clearing Chips. Metal chips can easily cut bare skin—even through a piece of cloth. Avoid clearing chips by hand or with a rag. Use a brush or vacuum to clear metal chips.

Chuck Key Safety. A chuck key left in the chuck can become a deadly projectile when the spindle is started. Always remove the chuck key after using it. Develop a habit of not taking your hand off of a chuck key unless it is away from the machine.

Tool Selection. Cutting with an incorrect or dull tool increases the risk of accidental injury due to the extra force required for the operation, which increases the risk of breaking or dislodging components that can cause small shards of metal to become dangerous projectiles. Always select the right cutter for the job and make sure it is sharp. A correct, sharp tool decreases strain and provides a better finish.

Securing Workpiece. An improperly secured workpiece can fly off the lathe spindle with deadly force, which can result in a severe impact injury. Make sure the workpiece is properly secured in the chuck or faceplate before starting the lathe.

Chucks. Chucks are very heavy and difficult to grasp, which can lead to crushed fingers or hands if mishandled. Get assistance when handling chucks to reduce this risk. Protect your hands and the precision-ground ways by using a chuck cradle or piece of plywood over the ways of the lathe when servicing chucks. Use lifting devices when necessary.

Safe Clearances. Workpieces that crash into other components on the lathe may throw dangerous projectiles in all directions, leading to impact injury and damaged equipment. Before starting the spindle, make sure the workpiece has adequate clearance by hand-rotating it through its entire range of motion. Also, check the tool and tool post clearance, chuck clearance, and saddle clearance.

Speed Rates. Operating the lathe at the wrong speed can cause nearby parts to break or the workpiece to come loose, which will result in dangerous projectiles that could cause severe impact injuries. Large or non-concentric workpieces must be turned at slow speeds. Always use the appropriate feed and speed rates.

Stopping Spindle by Hand. Stopping the spindle by putting your hand on the workpiece or chuck creates an extreme risk of entanglement, impact, crushing, friction, or cutting hazards. Never attempt to slow or stop the lathe spindle with your hand. Allow the spindle to come to a stop on its own or use the brake.

Crashes. Aggressively driving the cutting tool or other lathe components into the chuck may cause an explosion of metal fragments, which can result in severe impact injuries and major damage to the lathe. Reduce this risk by releasing automatic feeds after use, not leaving lathe unattended, and checking clearances before starting the lathe. Make sure no part of the tool, tool holder, compound rest, cross slide, or carriage will contact the chuck during operation.

Long Stock Safety. Long stock can whip violently if not properly supported, causing serious impact injury and damage to the lathe. Reduce this risk by supporting any stock that extends from the chuck/headstock more than three times its own diameter. Always turn long stock at slow speeds.

Coolant Safety. Coolant is a very poisonous biohazard that can cause personal injury from skin contact alone. Incorrectly positioned coolant nozzles can splash on the operator or the floor, resulting in an exposure or slipping hazard. To decrease your risk, change coolant regularly and position the nozzle where it will not splash or end up on the floor.

Additional Chuck Safety

Entanglement. Entanglement with a rotating chuck can lead to death, amputation, broken bones, or other serious injury. Never attempt to slow or stop the lathe chuck by hand, and always roll up long sleeves, tie back long hair, and remove any jewelry or loose apparel BEFORE operating.

Using Correct Equipment. Many workpieces can only be safely turned in a lathe if additional support equipment, such as a tailstock or steady rest, is used. If the operation is too hazardous to be completed with the lathe or existing equipment, the operator must have enough experience to know when to use a different machine or find a safer way.

Proper Maintenance. All chucks must be properly maintained and lubricated to achieve maximum clamping force and withstand the rigors of centrifugal force. To reduce the risk of a thrown workpiece, follow all maintenance intervals and instructions in this document.

Chuck Spindle Speed Rating. Chucks are rated for their safe maximum spindle speed. If chucks are used with a higher spindle speed than they are rated for, they may fail during operation and throw the workpiece or chuck parts at the operator or bystanders, causing severe impact injuries. Never use a spindle speed faster than the maximum chuck speed rating.

Chuck Capacity. Avoid exceeding the capacity of the chuck by clamping an oversized workpiece. If the workpiece is too large to safely clamp with the chuck, use a faceplate or a larger chuck if possible. Otherwise, the workpiece could be thrown from the lathe during operation, resulting in serious impact injury or death.

Clamping Force. Inadequate clamping force can lead to the workpiece being thrown from the chuck and striking the operator or bystanders. Maximum clamping force is achieved when the chuck is properly maintained and lubricated, all jaws are fully engaged with the workpiece, and the maximum chuck clamping diameter is not exceeded.

Trained Operators Only. Using a chuck incorrectly can result in workpieces coming loose at high speeds and striking the operator or bystanders with deadly force. To reduce the risk of this hazard, read and understand this document and seek additional training from an experienced chuck user before using a chuck.

Disconnect Power. Serious entanglement or impact injuries could occur if the lathe is started while you are adjusting, servicing, or installing the chuck. Always disconnect the lathe from power before performing these procedures.

Preparation Overview

The purpose of the preparation section is to help you prepare your machine for operation. The list below outlines this basic process. Specific steps for each of these points will be covered in detail later in this section.

The typical preparation process is as follows:

1. Unpack the lathe and inventory the contents of the box/crate.
2. Clean the lathe and its components.
3. Identify an acceptable location for the lathe and move it to that location.
4. Level the lathe and either bolt it to the floor or place it on mounts.
5. Assemble the loose components and make any necessary adjustments or inspections to ensure the lathe is ready for operation.
6. Check/lubricate the lathe.
7. Connect the lathe to the power source.
8. Test run the lathe to make sure it functions properly.
9. Perform the spindle break-in procedure to prepare the lathe for operation.

Things You'll Need

To complete the preparation process, you will need the following items:

For Lifting and Moving

- A forklift or other power lifting device rated for at least 25% more than the shipping weight of the lathe (see **Product Specifications** beginning on **Page 9**)
- Lifting straps, each rated for at least 25% more than the shipping weight of the lathe
- Guide rods for steadying the load when lifting
- Two other people for assistance when moving machine
- Hardwood blocking (see **Page 27**)

For Power Connection

- A power source that meets the minimum circuit requirements for this machine (review the **Power Supply Requirements** section on the next page for details)
- An electrician or qualified service personnel to ensure a safe and code-compliant connection to the power source

For Cleaning & Assembly

- Cotton rags
- Mineral spirits
- Quality metal protectant oil
- Safety glasses
- Wrench or socket 21mm
- Wrench or socket 19mm
- Floor mounting hardware as needed
- Precision level
- Standard screwdriver #2

Power Supply Requirements

Availability

Before installing the machine, consider the availability and proximity of the required power supply circuit. If an existing circuit does not meet the requirements for this machine, a new circuit must be installed.

To minimize the risk of electrocution, fire, or equipment damage, installation work and electrical wiring must be done by an electrician or qualified service personnel in accordance with all applicable codes.

WARNING

Serious injury could occur if you connect the machine to power before completing the setup process. DO NOT connect to power until instructed later in this manual.

Full-Load Current Rating

The full-load current rating is the amperage a machine draws at 100% of the rated output power. On machines with multiple motors, this is the amperage drawn by the largest motor or sum of all motors and electrical devices that might operate at one time during normal operations.

SB1042PF Full-Load Rating..... 18.83 Amps
SB1043PF Full-Load Rating..... 18.83 Amps
SB1045PF Full-Load Rating..... 18.83 Amps
SB1059F Full-Load Rating..... 16.83 Amps
SB1060PF Full-Load Rating..... 18.83 Amps
SB1061PF Full-Load Rating..... 18.83 Amps

CAUTION

For your own safety and protection of property, consult a qualified electrician if you are unsure about wiring practices or electrical codes in your area.

The full-load current is not the maximum amount of amps that the machine will draw. If the machine is overloaded, it will draw additional amps beyond the full-load rating.

If the machine is overloaded for a sufficient length of time, damage, overheating, or fire may result—especially if connected to an undersized circuit. To reduce the risk of these hazards, avoid overloading the machine during operation and make sure it is connected to a power supply circuit that meets the requirements in the following section.

Circuit Requirements

This machine is prewired to operate on a 440V power supply circuit that has a verified ground and meets the following requirements:

Nominal Voltage 440V/480V
Cycle 60 Hz
Phase 3-Phase
Circuit Rating..... 30 Amps
Connection.. Hardwire with Locking Switch

A power supply circuit includes all electrical equipment between the main breaker box or fuse panel in your building and the incoming power connections inside the machine. This circuit must be safely sized to handle the full-load current that may be drawn from the machine for an extended period of time.

Note: The circuit requirements listed in this manual apply to a dedicated circuit—where only one machine will be running at a time. If this machine will be connected to a shared circuit where multiple machines will be running at the same time, consult a qualified electrician to ensure that the circuit is properly sized for safe operation.

Grounding Requirements

This machine must be grounded! In the event of certain types of malfunctions or breakdowns, grounding provides a path of least resistance for electric current in order to reduce the risk of electric shock.

Improper connection of the equipment-grounding wire can result in a risk of electric shock. The wire with green insulation (with or without yellow stripes) is the equipment-grounding wire. If repair or replacement of the power cord is necessary, do not connect the equipment-grounding wire to a live (current carrying) terminal.

Check with a qualified electrician or service personnel if you do not understand these grounding requirements, or if you are in doubt about whether the machine is properly grounded. If you ever notice that a cord is damaged or worn, disconnect it from power, and immediately replace it with a new one.



⚠️ WARNING

Electrocution or fire may occur if machine is not correctly grounded and attached to the power supply. Use an electrician or qualified service personnel to ensure a safe power connection.

440V Operation

As specified in the **Circuit Requirements** section on the previous page, these machines must be hardwired to the power source, using a locking switch (see **Figure 10**).

These machines must also be connected to a grounded metal permanent wiring system; or to a system with an equipment-grounding conductor. Due to the complexity and high voltage involved, this type of installation **MUST** be done by an electrician or qualified service personnel.

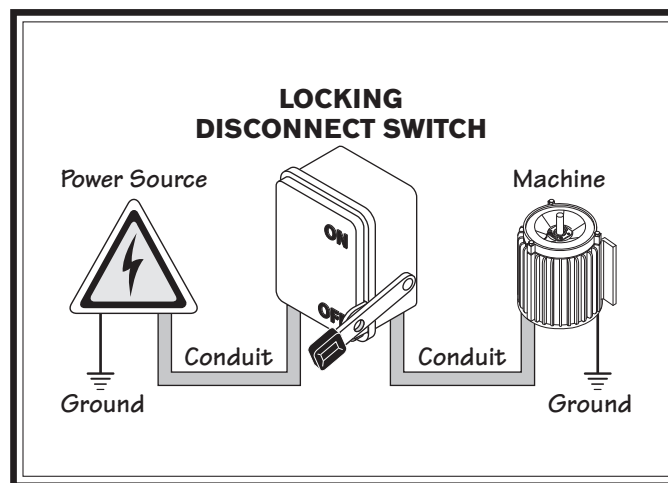


Figure 10. Typical hardwire setup with a locking disconnect switch.

Unpacking

This item was carefully packaged to prevent damage during transport. If you discover any damage, please immediately call Customer Service at (360) 734-1540 for advice. You may need to file a freight claim, so save the containers and all packing materials for possible inspection by the carrier or its agent.

Inventory

Main Inventory 1 (Figure 11)

	Qty
A. Steady Rest Assembly.....	1
B. 14" Faceplate w/D1-8 Camlock Stud Set	1
C. 3-Jaw Chuck Key	1
D. Model SB1232 14" Four-Jaw Chuck w/Combo Jaws	1
E. 4-Jaw Chuck Key (Clamped on Lathe)	1
F. Tool Post T-Wrench (Clamped on Lathe).....	1
G. Follow Rest Assembly (Installed).....	1

Tool Box Inventory (Figure 12)

	Qty
H. Tool Box	1
I. Open End Wrench 22/24mm	1
J. Open End Wrench 14/17mm	1
K. Open End Wrench 10/12mm	1
L. Combination Wrench 27mm.....	1
M. Phillips Screwdriver #2	1
N. Standard Screwdriver #2.....	1
O. Carbide-Tipped Dead Center MT#5.....	1
P. Dead Center MT#5.....	1
Q. Tapered Spindle Sleeve MT#7-#5	1
R. Carriage Handwheel Handle.....	1
S. Cross Slide Handwheel Handle.....	1
T. Hex Wrench Set 1.5-10mm.....	1
U. Hex Wrench 10mm	1
V. Cast Iron Feet	8

Installed & Not Shown

	Qty
• SB1312 12" 3-Jaw Chuck	1

Note: Some inventory components or additional documentation may be shipped inside of the lathe electrical cabinet. These items MUST be removed before connecting the lathe to the power source.

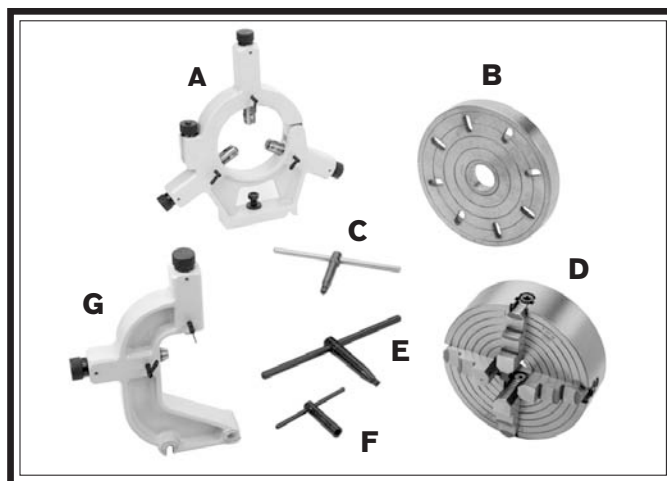


Figure 11. Main inventory.

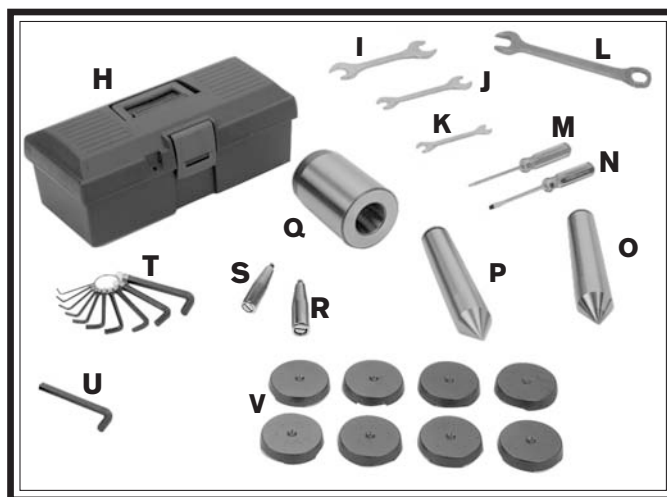


Figure 12. Toolbox inventory.

Cleaning & Protecting

The unpainted surfaces are coated at the factory with a heavy-duty rust preventative that prevents corrosion during shipment and storage. The benefit of this rust preventative is that it works very well. The downside is that it can be time-consuming to thoroughly remove.

Be patient and do a careful job when cleaning and removing the rust preventative. The time you spend doing this will reward you with smooth-sliding parts and a better appreciation for the proper care of the unpainted surfaces.

Although there are many ways to successfully remove the rust preventative, we have cleaned thousands of machines and found the following process to be the best balance between efficiency and minimized exposure to toxic fumes or chemicals.

Before cleaning, gather the following:

- Disposable rags
- Cleaner/degreaser (certain citrus-based degreasers work extremely well and they have non-toxic fumes)
- Safety glasses & disposable gloves

Note: Automotive degreasers, mineral spirits, or WD•40 can be used to remove rust preventative. Before using these products, though, test them on an inconspicuous area of a painted surface to make sure they will not damage it.



WARNING

Gasoline and petroleum products have low flash points and can explode or cause fire if used for cleaning. Avoid using these products to remove rust preventative.



CAUTION

Many cleaning solvents are toxic if inhaled. Minimize your risk by only using these products in a well ventilated area.

NOTICE

Avoid chlorine-based solvents, such as acetone or brake parts cleaner that may damage painted surfaces. Always follow the manufacturer's instructions when using any type of cleaning product.

Basic steps for removing rust preventative:

1. Put on safety glasses and disposable gloves.
2. Coat all surfaces that have rust preventative with a liberal amount of your cleaner or degreaser and let them soak for a few minutes.
3. Wipe off the surfaces. If your cleaner or degreaser is effective, the rust preventative will wipe off easily.

Note: To clean off thick coats of rust preventative on flat surfaces, such as beds or tables, use a PLASTIC paint scraper to scrape off the majority of the coating before wiping it off with your rag. (Do not use a metal scraper or it may scratch the surface.)

4. Repeat Steps 2–3 as necessary until clean, then coat all unpainted surfaces with a quality metal protectant or light oil to prevent rust.

NOTICE

Remove the end gear cover and end gears, and use a stiff brush with mineral spirits to clean the rust preventative from the gears and shafts. DO NOT get any cleaner or rust preventative on the V-belts, as it could damage them or make them slip during operations. If the belts do become contaminated, replace them.

Location

Physical Environment

The physical environment where your machine is operated is important for safe operation and longevity of parts. For best results, operate this machine in a dry environment that is free from excessive moisture, hazardous or flammable chemicals, airborne abrasives, or extreme conditions. Extreme conditions for this type of machinery are generally those where the ambient temperature is outside the range of 41°–104°F; the relative humidity is outside the range of 20–95% (non-condensing); or the environment is subject to vibration, shocks, or bumps.

Electrical Installation

Place this machine near an existing power source. Make sure all power cords are protected from traffic, material handling, moisture, chemicals, or other hazards. Make sure to leave access to a means of disconnecting the power source or engaging a lockout/tagout device.

Lighting

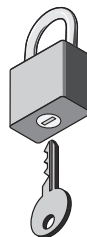
Lighting around the machine must be adequate enough that operations can be performed safely. Shadows, glare, or strobe effects that may distract or impede the operator must be eliminated.

Weight Load

Refer to the **Machine Specifications** for the weight of your machine. Make sure that the surface upon which the machine is placed will bear the weight of the machine, additional equipment that may be installed on the machine, and the heaviest workpiece that will be used. Additionally, consider the weight of the operator and any dynamic loading that may occur when operating the machine.

Space Allocation

Consider the largest size of workpiece that will be processed through this machine and provide enough space around the machine for adequate operator material handling or the installation of auxiliary equipment. With permanent installations, leave enough space around the machine to open or remove doors/covers as required by the maintenance and service described in this manual.



CAUTION

Children or untrained people may be seriously injured by this machine. Only install in an access restricted location.

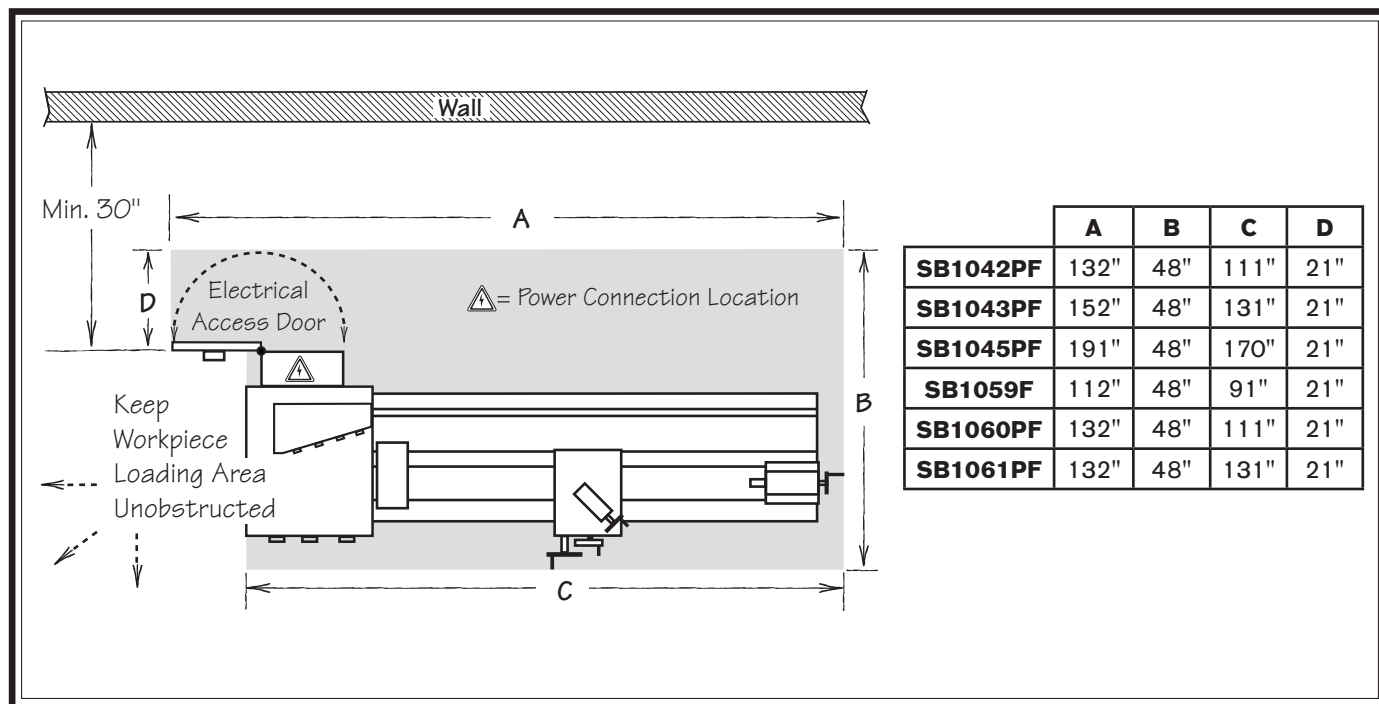
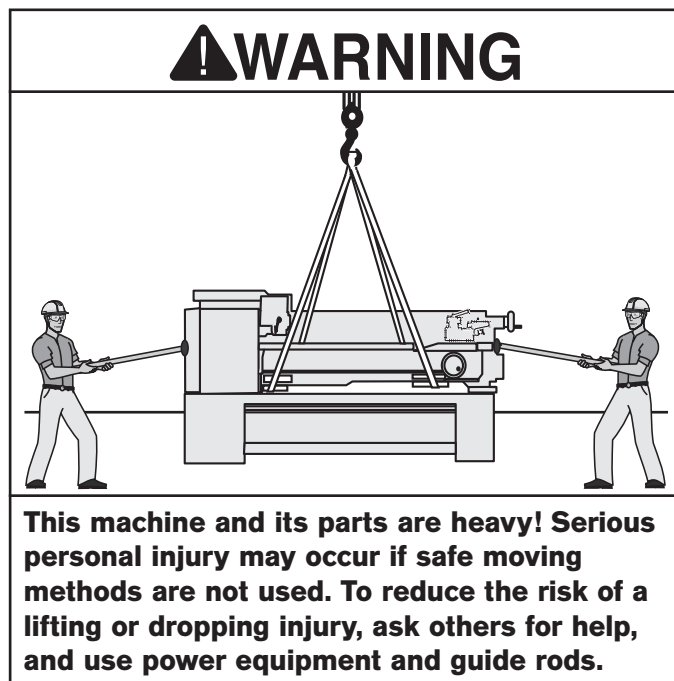


Figure 13. Space required for full range of movement.

Lifting & Moving



Do not attempt to lift or move this lathe without using the proper lifting equipment (such as forklift or crane) or the necessary assistance from other people. Each piece of lifting equipment must be rated for at least 25% more than the shipping weight of your lathe to support dynamic loads that may be applied while lifting. Refer to **Things You'll Need** on **Page 21** for details.

To lift and move the lathe:

1. Remove the shipping crate top and sides, then remove the small components from the shipping pallet.
2. Move the lathe to its prepared location while it is still attached to the shipping pallet.
3. Unbolt the lathe from the shipping pallet
4. To balance the load for lifting, move the tailstock and carriage to the extreme right end of the bedway, then lock them in place.

Note: Before attempting to move the carriage, make sure the carriage lock is loose, the half nut is disengaged, and the power feed is disengaged (feed ON/OFF lever).

5. Position hardwood blocking under each end of the bed as shown in **Figure 14**. This will keep the lifting straps away from the leadscrew, feed rod, and spindle rod to prevent bending them during lifting.

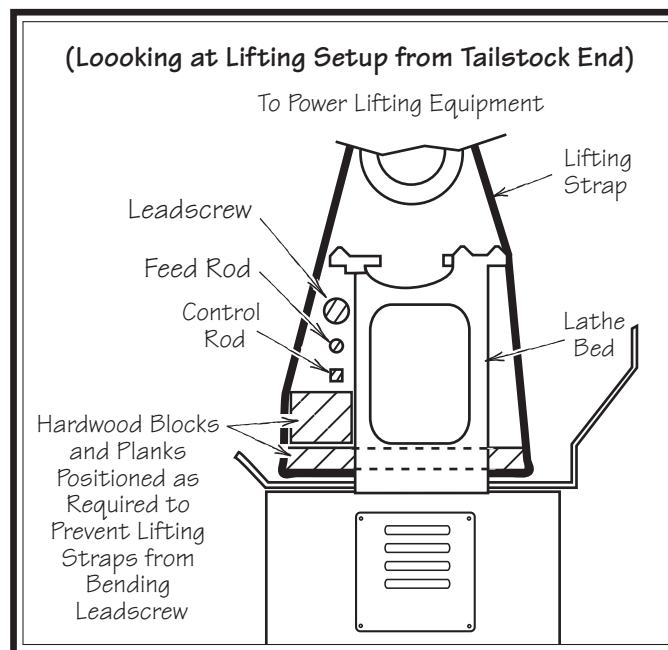


Figure 14. Lifting setup to keep straps from bending leadscrew or rods.

6. Attach the lifting straps to the power lifting equipment (see **Figure 15** for an example).

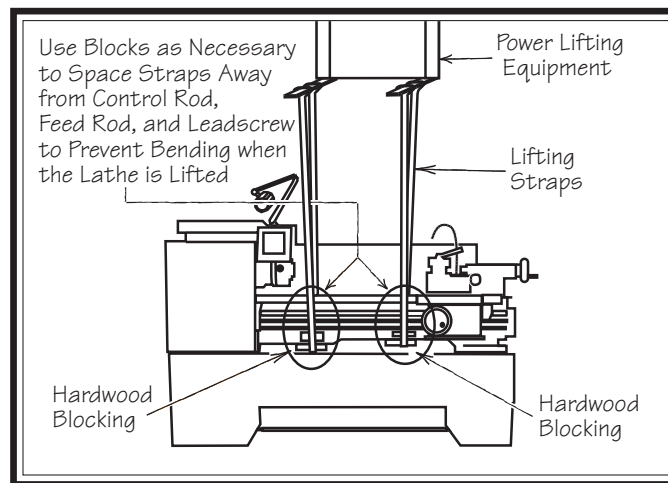


Figure 15. Example of lathe setup for lifting.

7. At each end of the lathe, have assistants connect guide rods to safely keep the lathe from swaying or tipping during lifting.
8. Raise the lathe a couple of inches and check the balance of the load.
 - If the load is not safely balanced, immediately lower the lathe and resolve the issue before attempting to lift it again.
9. Raise the lathe enough to clear the shipping pallet, carefully remove the pallet, then lower the lathe into position.

Leveling & Mounting

You must level your machine and either use the included foot pads and leveling hardware or bolt and shim your lathe to the floor. Because mounting your lathe to the floor with permanent hardware is an optional step and floor materials may vary, floor mounting hardware is not included.

Leveling

NOTICE

For accurate turning results and to prevent warping the cast iron bed and ways, the lathe bedways MUST be leveled from side-to-side and from front-to-back on both ends.

Re-check the bedways 24 hours after installation, two weeks after that, and then annually to make sure they remain level.

Leveling machinery helps precision components, such as bedways, remain straight and flat during the lifespan of the machine. Components on a machine that is not level may slowly twist due to the dynamic loads placed on the machine during operation.

For best results, use a precision level that is at least 12" long and sensitive enough to show a distinct movement when a 0.003" shim (approximately the thickness of one sheet of standard newspaper) is placed under one end of the level.

See the figure below for an example of a high precision level.

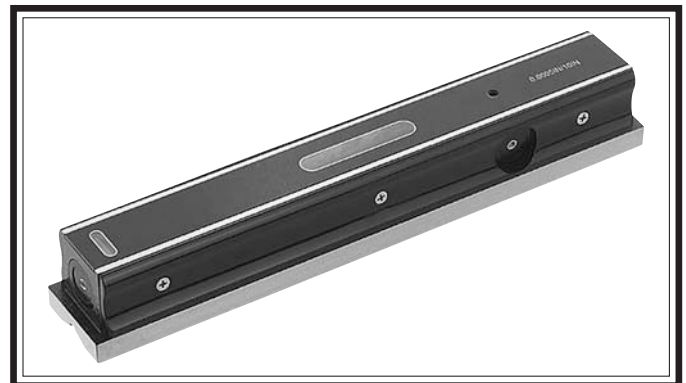


Figure 16. Example of a precision level.

To level the machine, use a precision level to make sure the bedways are level from side-to-side and from front-to-back.

- If using the included leveling pads (see **Figure 17**), place them under the six leveling jack bolt locations, then adjust the bolts to level the lathe.

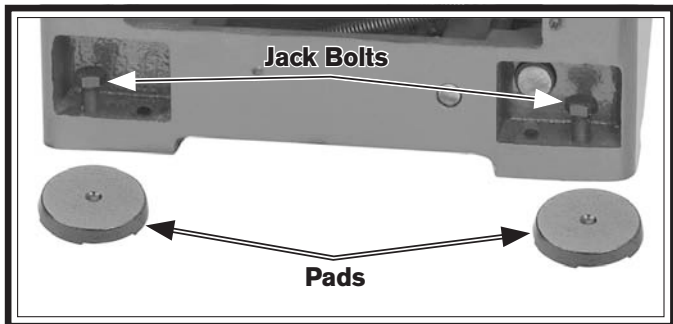


Figure 17. Leveling pads and screws.

- If using mounting hardware that does not allow for adjustment, level the lathe by placing metal shims between the lathe base and the floor before bolting it down.

Bolting to Concrete Floors

Lag screws and anchors, or anchor studs (**below**), are two popular methods for bolting machinery to a concrete floor. We suggest you research the many options and methods for mounting your machine and choose the best one for your specific application.

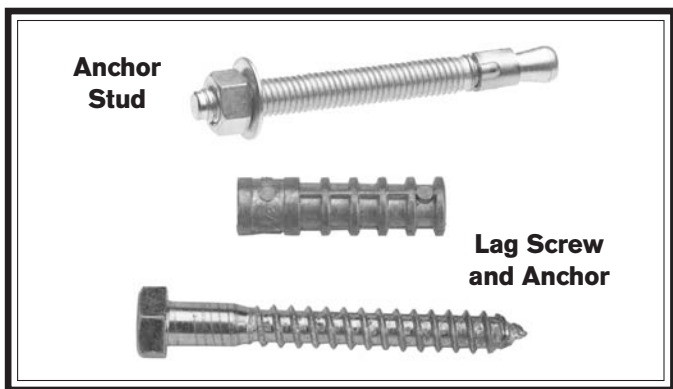


Figure 18. Common types of fasteners for bolting machinery to concrete floors.

NOTICE

Most electrical codes require that machines connected to the power source by fixed conduit MUST be secured to the floor.

Assembly

With the exception of the handwheel handles, the lathe is shipped fully assembled.

To install the handwheel handles, thread the large handle into the carriage handwheel and the small handle into the cross slide handwheel, as shown in **Figure 19**.

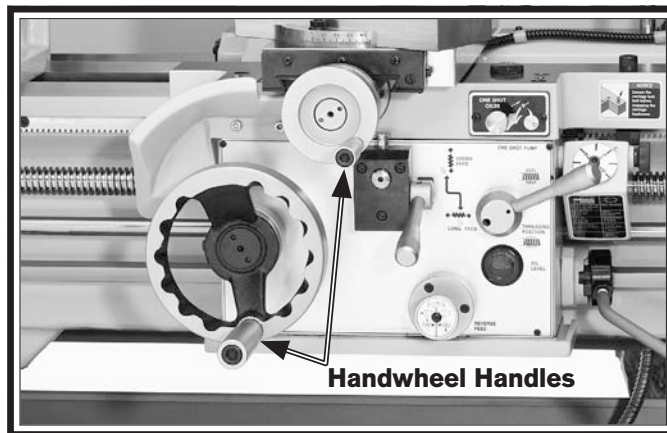


Figure 19. Handwheel handles installed.

Lubricating Lathe



The headstock, quick-change gearbox, and apron oil reservoirs must have the proper amount of oil in them before the lathe can be operated for the first time.

Damage caused to the bearings and gears from running the lathe without oil in the reservoirs will not be covered under warranty. Refer to the **Lubrication** section, beginning on **Page 68**, for details on how to check, add oil, and prime the headstock oil pump.

In addition to the reservoirs, we also recommend that you lubricate all other points on the machine at this time. This can be accomplished by following the maintenance schedule on **Page 66**.

Note: If this lathe was shipped with oil in the reservoirs, do not change that oil until after the test run and spindle break-in procedures.

Adding Coolant

Add the coolant of your choice now. For detailed instructions on where the coolant tank is located and how to add fluid, refer to **Coolant System Service** on **Page 75**.

Power Connection

After you have completed all previous setup instructions and circuit requirements, the machine is ready to be connected to the power supply.

Due to the complexity required for planning, bending, and installing the conduit necessary for a code-compliant hardwire setup, an electrician or other qualified person **MUST** perform this type of installation.

Hardwire setups typically require power supply wires to be enclosed inside of a solid or flexible conduit, which is securely mounted at both ends with the appropriate conduit fittings. All work must adhere to the required electrical codes.

The hardwire setup must include a locking disconnect switch (see **Figure 20**) between the power source and the machine. This switch serves as the means to completely disconnect the machine from power to prevent electrocution from accidental startup during adjustments, maintenance, or service to the machine.

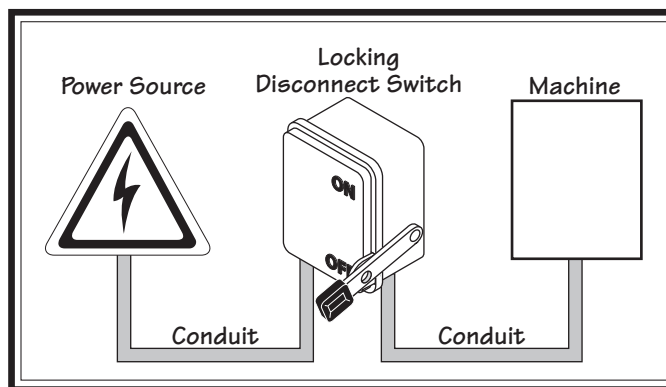


Figure 20. Typical hardwire setup with a locking disconnect switch.

⚠ WARNING

Electrocution could occur if you attempt this procedure with the power wires connected to the power source. The incoming power wires must be disconnected from power before performing this procedure.

Connecting Power

1. Make sure the master power switch is turned to the OFF position, then open the electrical cabinet door.
2. Refer to **Figure 21** to identify the master power switch and the hole at the bottom left of the electrical cabinet for the incoming power.

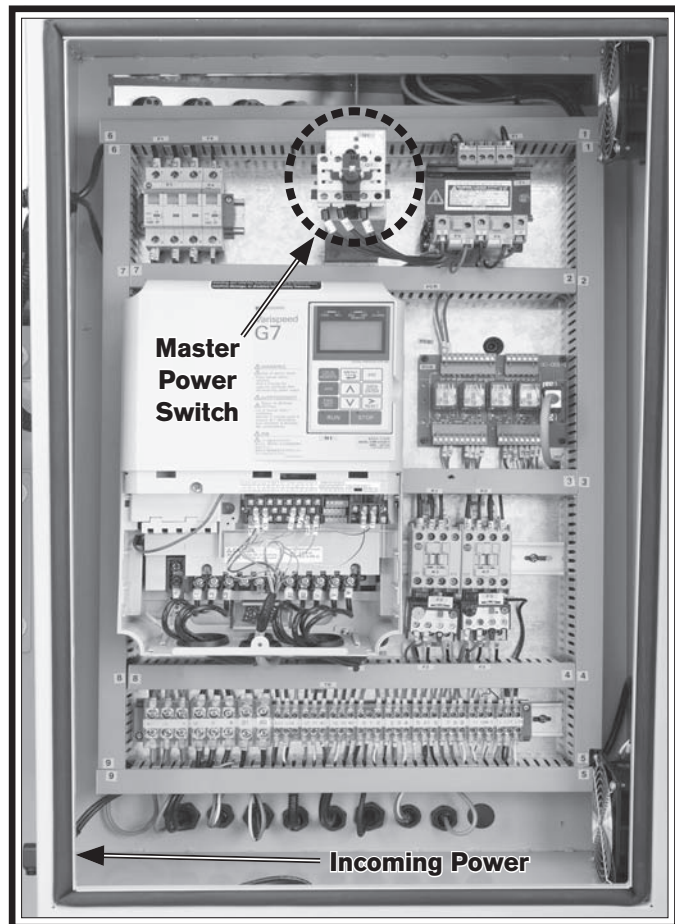


Figure 21. Electrical cabinet.

3. Connect the incoming hot wires to the upper master power switch terminals and the ground wire to the ground terminal, as illustrated in **Figure 22**.

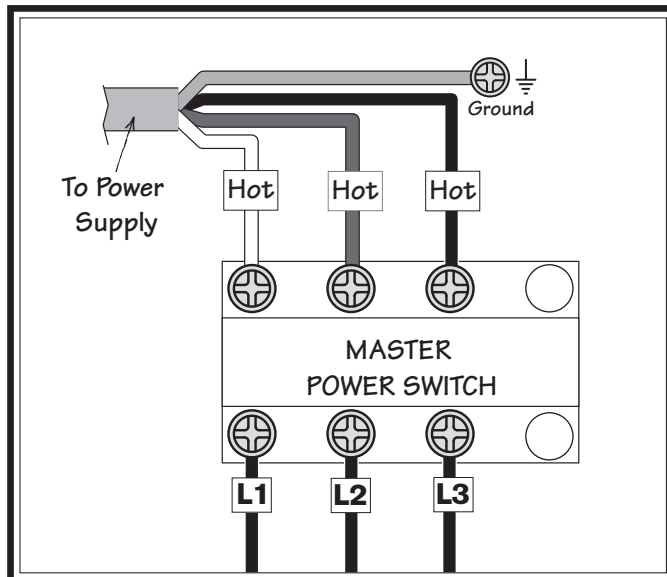


Figure 22. Power connection at master power switch.

4. Make sure the wires have enough slack so that they do not bind at the terminals.
5. Close and lock the main electrical box door.

NOTICE

To avoid unexpected start-up of lathe components, keep the master power switch turned OFF until instructed otherwise in the following test run.

Test Run

After all preparation steps have been completed, the machine and its safety features must be tested to ensure correct operation. If you discover a problem with the operation of the machine or its safety components, shut the machine down, disconnect it from power, and do not operate it further until you have resolved the problem.

A **Troubleshooting** section is provided, starting on **Page 88**, to assist you with solutions if a problem occurs or if the lathe does not function as described in this section.

If you need additional help after reviewing the troubleshooting section, or you are not confident troubleshooting the machine on your own, contact our Tech Support at (360) 734-1540.

To test run your machine:

1. Make sure the master power switch on the rear of the machine is turned **OFF** (see **Figure 23**).

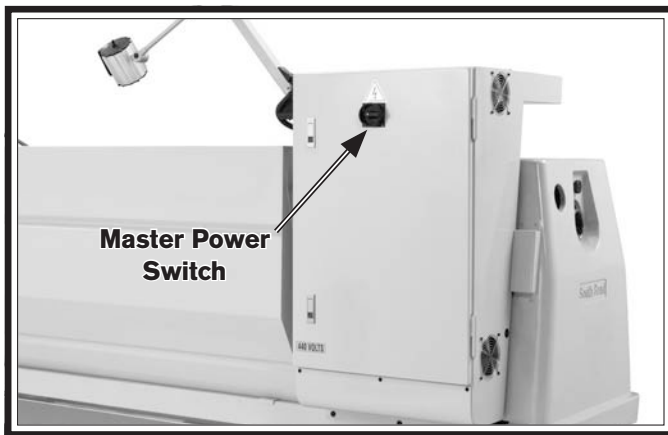


Figure 23. Location of the master power switch.

2. Read and follow the safety instructions at the beginning of the manual, take all required safety precautions, and make sure all previous preparation steps discussed in this manual have been followed and completed.

3. Clear away all tools and objects used during assembly, lubrication, and preparation.
4. Make sure that the chuck and jaws, if installed, are secure (refer to **Chuck and Faceplate Mounting** on **Page 37**).

Note: If a chuck is not installed on the lathe, you do not need to install one for this test.

5. Push the STOP button on the control panel (see **Figure 24**), then rotate the spindle speed dial all the way to the left to set the spindle speed at the lowest setting.

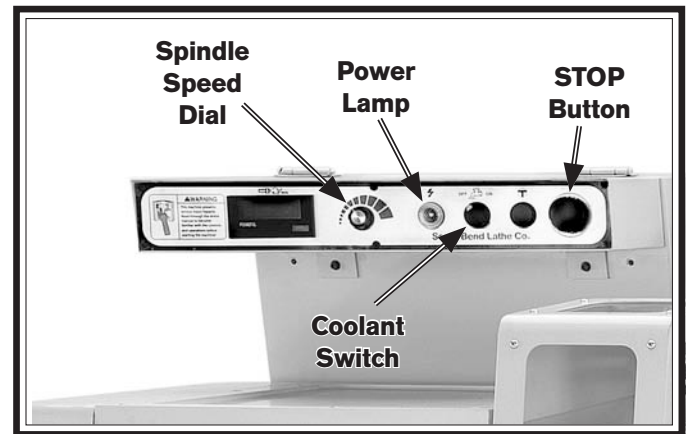


Figure 24. Control panel.

6. Turn the coolant pump switch to the **OFF** position, and point the coolant nozzle into the chip pan.

7. Move the spindle speed range lever to low speed range 1 (18-55 RPM), as shown in **Figure 25**.

Note: You may need to rock the spindle back-and-forth by hand to mesh the gears.

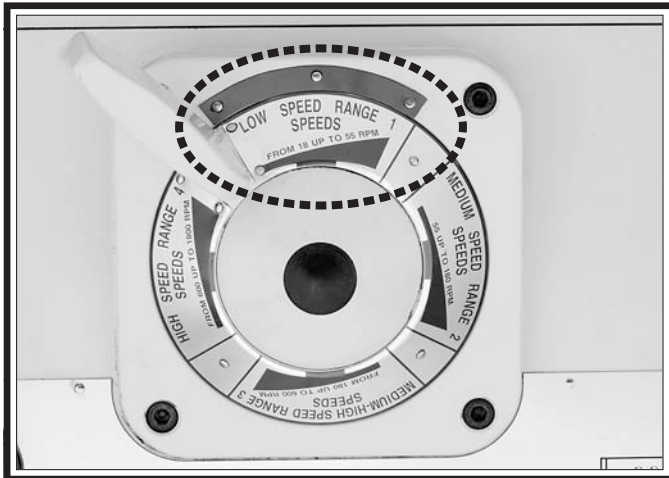


Figure 25. Spindle speed range lever.

8. Move the gearbox range lever on the headstock to the neutral (middle) position to disable power feed, as shown in **Figure 26**.

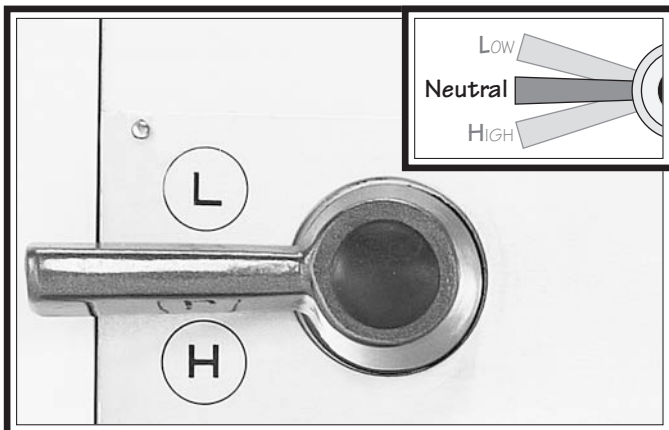


Figure 26. Gearbox range lever in neutral.

9. Pull up on the half nut and the feed ON/OFF levers (see **Figure 27**), then use the carriage handwheel to move the carriage back and forth to ensure that it is not engaged with the leadscrew or feed rod.

Note: Steps 8–9 will ensure that the carriage and cross slide do not unexpectedly move during the following steps.

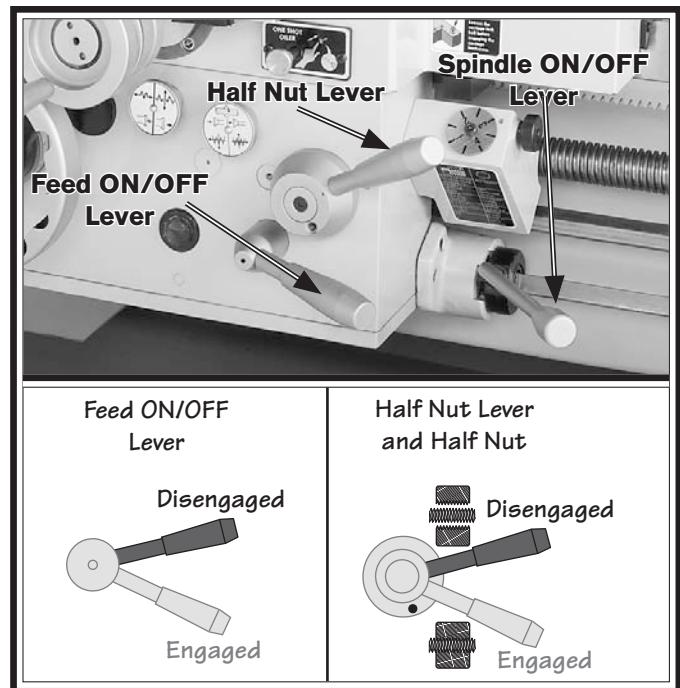


Figure 27. Apron controls for test run.

10. To prevent the spindle from rotating when power is applied to the motor, move the spindle ON/OFF lever to the OFF (middle) position (see **Figure 27**).
11. Turn the master power switch **ON**, then reset the STOP button by twisting it clockwise until it pops out. The headstock oil pump will turn **ON**.
12. Observe the oil pump tube through the sight glass on the headstock (see **Figure 28**). Verify that you see oil flowing.

Important: The headstock has a pressurized oil system that is equipped with a pressure safety switch. If the oil is not properly flowing, the lathe will not start.

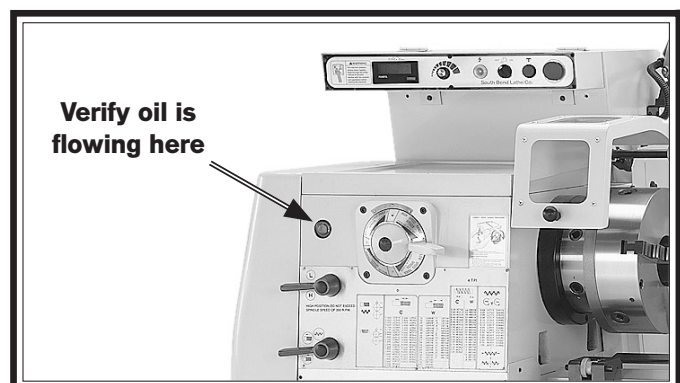


Figure 28. Headstock oil sight glass.

13. Move the spindle ON/OFF lever down to start the spindle rotating counterclockwise (down toward the front of the lathe).
 - If the spindle rotates in the opposite direction (clockwise), the power supply phase polarity may be incorrect. Refer to **Correcting Phase Polarity on Page 92** to resolve this.
 14. Observe the lathe and listen for any abnormal noises or vibration. The lathe should run smoothly.
 15. Push the STOP button. The spindle should come to a slow stop.
 16. Move the spindle ON/OFF lever up to the OFF (middle) position, reset the STOP button by twisting it clockwise until it pops out, then restart spindle rotation by moving it down again.
 17. Press the foot brake. The spindle should come to a quick stop.
 - If the foot brake has no effect on the stopping speed of the spindle, push the STOP button and refer to **Brake Service on Page 82** to adjust the brake.
 18. Push the STOP button and move the spindle ON/OFF lever up to the OFF (middle) position to prevent accidental start-up.
 19. Remove the end gear cover from the left side of the headstock. There is a safety switch that prevents the spindle from starting while this cover is removed.
 20. Reset the STOP button, stand away from all the exposed gears on the side of the headstock, then attempt to start spindle rotation—the spindle should not start.
 - If the spindle does start with the end gear cover removed, the safety limit switch is not adjusted or operating correctly. This safety feature must operate properly before continuing. Press the STOP button to turn the lathe **OFF**, disconnect it from power, and call Tech Support for help.
 21. Push the STOP button in, move the spindle ON/OFF lever to the OFF position, then replace the end gear cover.
 22. Reset the STOP button, then lift the chuck guard up—this will activate the chuck guard safety switch to prevent spindle rotation. Attempt to start spindle rotation—the spindle should not start.
 - If the spindle starts with the chuck guard in the up position, the safety switch is not adjusted or operating correctly. This safety feature must operate properly before continuing. Press the STOP button to turn the lathe **OFF**, disconnect it from power, and call Tech Support for help.
 23. Move the chuck guard back down into operating position.
 24. Point the coolant nozzle down into the chip drawer and verify that there is coolant in the reservoir (refer to **Coolant System Service on Page 75** for detailed instructions).
 25. Use the coolant pump switch on the control panel to start the pump, then open the valve at the base of the nozzle. Verify that the coolant flows from the nozzle, then close the valve and turn the pump **OFF**.
- Congratulations! The test run is complete. Perform the following **Spindle Break-In** procedure.

Spindle Break-In

Before subjecting the lathe to full loads, it is essential to complete the spindle break-in process as described below. This will ensure the best results and maximum life of the precision components inside the lathe.

The break-in procedure must be performed in succession with the **Test Run** procedure described in this manual, because many of the test run steps prepare the lathe controls for the break-in process.

Important: Do not perform the break-in procedure independently from the **Test Run** section—serious damage could occur to the lathe if the controls are set differently than instructed in that section.

NOTICE

Do not leave the lathe unattended during the Spindle Break-In procedure. If your attention is needed elsewhere during this procedure, stop the lathe and restart the procedure later from the beginning.

To perform the spindle break-in:

1. Successfully complete the **Test Run** procedure beginning on **Page 32**.
2. Using the speed dial on the control panel and the spindle speed range lever to set the spindle speed, run the lathe for ten minutes at each of the following speeds: 55, 180, 600, and 1800 RPM.
3. Use the foot brake to stop spindle rotation, then reverse spindle rotation and run the lathe at 1800 RPM for 10 minutes.
4. Use the foot brake to stop spindle rotation, then run the lathe at 180 RPM for ten minutes with the gearbox range lever on the headstock in the **L** (low) position, and then run the lathe another ten minutes with the lever in the high position.

5. While the oil is still warm and any metal particles are still suspended in the oil, change the headstock and gearbox oil (refer to **Lubrication** beginning on **Page 68** for detailed instructions).
6. Check the V-belt tension, and if necessary, re-tension them (refer to **V-Belts** on **Page 81** for detailed instructions).

Congratulations! The spindle break-in is complete.

Recommended Adjustments

For your convenience, the adjustments listed below have been performed at the factory. However, because of the many variables involved with shipping, we recommend that you at least verify the following adjustments to ensure the best possible results from your new machine.

Step-by-step instructions for these adjustments can be found on the pages referenced below.

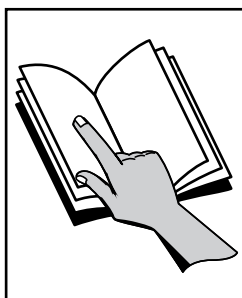
Factory adjustments that should be verified:

- Tailstock alignment (**Page 45**).
- Compound and cross slide backlash adjustment (**Page 78**).
- Gib adjustments (**Page 79**).

Operation Overview

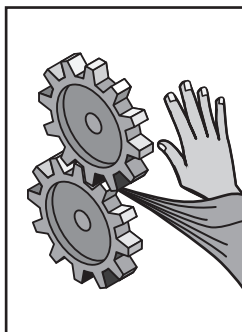
The purpose of this overview is to provide the novice machine operator with a basic understanding of how the machine is used during operation, so they can more easily understand the controls discussed later in this manual.

Note: Due to the generic nature of this overview, it is not intended to be an instructional guide for performing actual machine operations. To learn more about specific operations and machining techniques, seek training from people experienced with this type of machine, and do additional research outside of this manual by reading "how-to" books, trade magazines, or websites.



!WARNING

To reduce the risk of serious injury when using this machine, read and understand this entire manual before beginning any operations.



!WARNING

Loose hair, clothing, or jewelry could get caught in machinery and cause serious injury or death. Keep these items away from moving parts at all times to reduce this risk.



!WARNING

During operation, small metal chips may become airborne, leading to serious eye injury. Wear safety glasses to reduce this risk.

To complete a typical operation, the operator does the following:

1. Puts on safety glasses, rolls up sleeves, removes jewelry, and secures any clothing, jewelry, or hair that could get entangled in moving parts.
2. Examines the workpiece to make sure it is suitable for turning, then securely mounts the workpiece in one of the chucks or on the faceplate, and removes the chuck key from the chuck.
3. Mounts the tooling, aligns it with the workpiece, then backs it away to establish a safe startup clearance.
4. Clears all setup tools from the lathe.
5. Checks for safe clearances by rotating the workpiece by hand at least one full revolution.
6. Moves slides to where they will be used during operation.
7. Sets the correct spindle speed for the operation.
8. If using power feed, selects the proper feed rate for the operation.
9. Turns the master power switch **ON**, resets the STOP button, then uses the spindle ON/OFF lever to start spindle rotation.
10. Uses the carriage handwheels or power feed options to move the tooling into the workpiece for operations.
11. When finished cutting, moves the spindle ON/OFF lever to the OFF position, presses the foot brake to completely stop the spindle, then removes the workpiece.

Chuck & Faceplate Mounting

This lathe is equipped with a D1-type spindle nose. This type of spindle uses camlocks that are adjusted with a chuck key to securely mount a chuck or faceplate with repeatable precision and ease.

⚠ WARNING

Never use spindle speeds faster than the chuck RPM rating or the safe limits of your workpiece. Excessive spindle speeds greatly increase the risk of the workpiece or chuck being thrown from the machine with deadly force!

This lathe ships with the 3-jaw chuck installed. This is a scroll-type chuck where all three jaws move in unison when the chuck key is used.

The included 4-jaw chuck features independent jaws, which are used for square or unevenly-shaped stock, and to mount work that needs to be adjusted to near zero total indicated runout.

If neither chuck can hold your workpiece, the cast iron faceplate has slots for T-bolts that hold standard or custom clamping hardware. With the correct clamping hardware, this faceplate will hold non-cylindrical parts.

Installation & Removal Devices

Because chucks are heavy and often awkward to hold, some kind of lifting, support, or protective device should be used during installation or removal. The weight and size of the chuck will determine the appropriate device to use (refer to the following figure for examples).

⚠ WARNING

A dropped chuck can cause amputation, serious crushing injuries, or property damage. Always use a lifting, support, or protective device to reduce this risk when installing or removing a chuck.

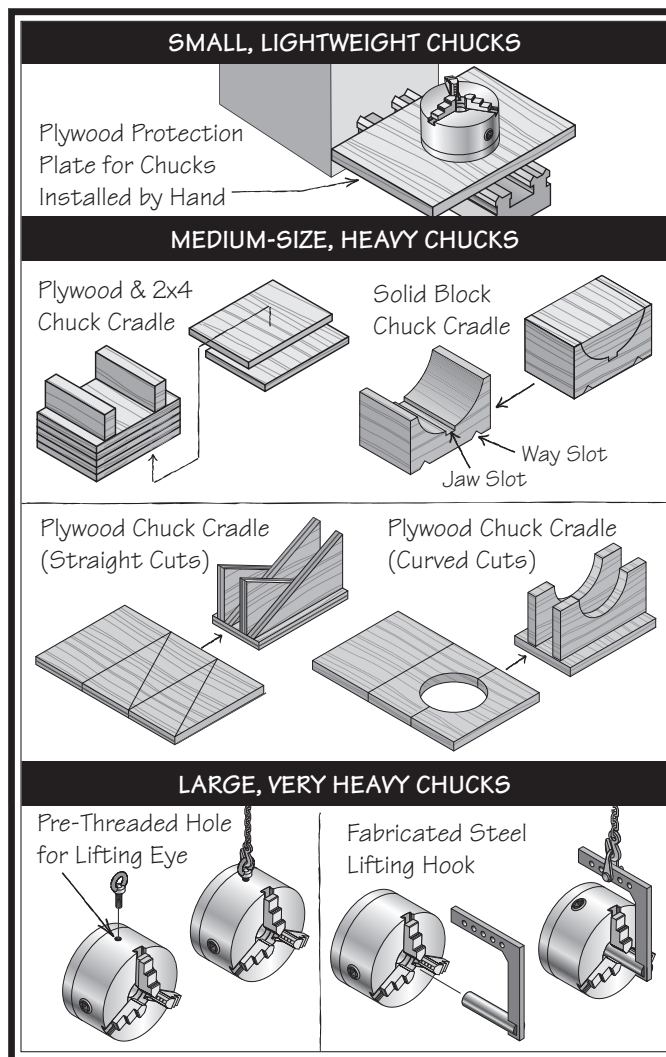


Figure 29. Examples of common devices used during chuck installation and removal.

Chuck Installation

To ensure accurate work, it is extremely important to make sure the spindle nose and chuck mating surfaces/tapers are clean. Even a small amount of lint or debris can affect accuracy.

The chuck is properly installed when all camlocks are tight, the spindle and chuck tapers firmly lock together, and the back of chuck is firmly seated against the face of the spindle all the way around—without any gaps.

To install the chuck:

1. DISCONNECT LATHE FROM POWER!
2. Use an appropriate lifting, support, or protective device to protect the ways and support the chuck during the installation process.
3. Clean and lightly oil the camlock studs, then thoroughly clean the mating surfaces of the spindle and chuck.
4. Install the chuck by inserting the camlock studs straight into the spindle cam holes.

Important: Avoid inserting the studs by pivoting them in from an angle or rotating the spindle. This can damage studs or spindle cam holes.

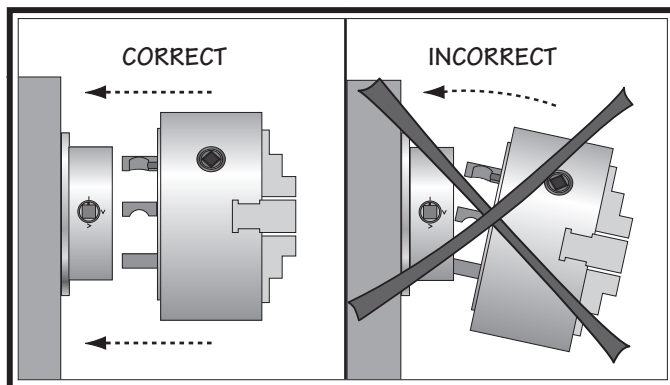


Figure 30. Inserting camlock studs into spindle cam holes.

5. Incrementally tighten the camlocks in a criss-cross or star pattern to ensure that the chuck seats evenly against the spindle.
6. When the chuck is fully seated and all the camlocks are tight, verify that the cam line is between the two "V" marks on the spindle nose, as shown in the following figure.

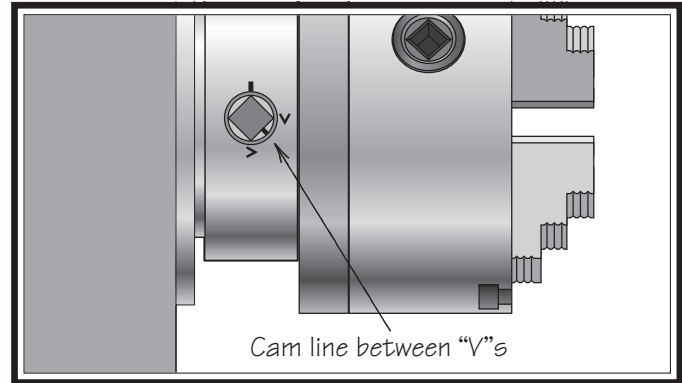


Figure 31. Cam line positioned between the "V" marks after the camlocks are fully tightened.

- If the cam line is NOT between the "V" marks when the camlock is tight, the stud may be installed at the incorrect height. To fix this, adjust the stud height as shown in the following figure. Make sure to re-install the stud cap screw afterward.
- If adjusting the stud height does not correct the problem, try swapping stud positions on the chuck.

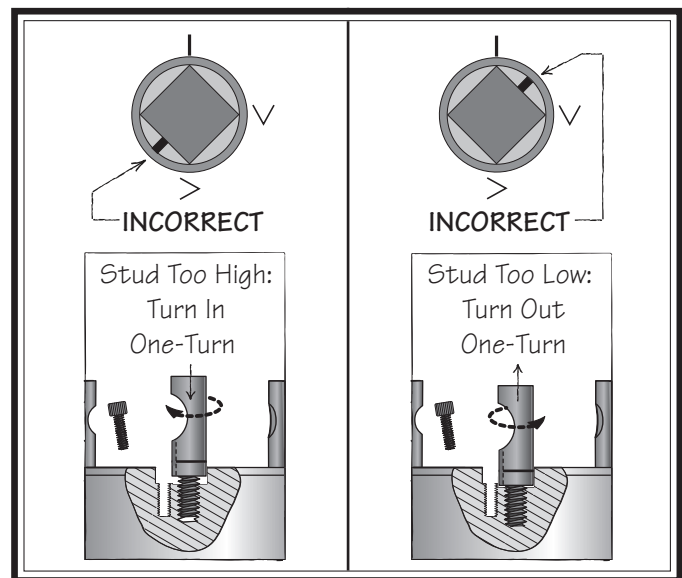


Figure 32. Correcting an improperly installed stud.

7. Verify that the chuck fits the spindle properly by checking for any gaps between the mating surfaces.
 - If there are no gaps, proceed to **Step 8**.
 - If there is a gap, remove the chuck, re-clean the mating surfaces carefully, and re-install. If the problem persists, contact our Tech Support.
8. Verify that the chuck/spindle tapers are seated firmly together by removing the chuck, per the **Chuck Removal** instructions, and pay close attention to how easily the tapers release.
 - If it was necessary to bump the chuck or use a mallet to release the tapers, then they are seating together properly.
 - If the tapers released easily with little intervention, they are not seated together firmly as required. Remove the chuck, re-clean the mating surfaces carefully, and re-install. If the problem persists, contact our Tech Support.

Registration Marks

Lightly stamp registration marks across the mating seams of chuck components. These marks will help you re-install the chuck in the same position after removal, which ensures consistent chuck balance and turning results, and allows the same camlocks and studs to operate together for consistent locking and unlocking.

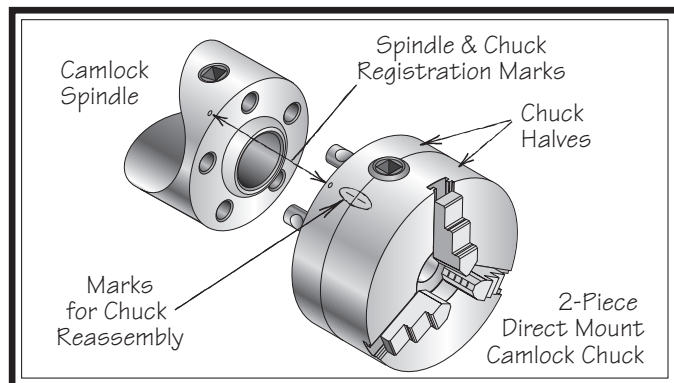


Figure 33. Registration mark locations.

Chuck Removal

To remove the chuck:

1. DISCONNECT LATHE FROM POWER!
2. Use an appropriate lifting, support, or protective device to protect the ways and support the chuck (refer to **Installation & Removal Devices** on **Page 37**).
3. Loosen the camlocks by turning the key counterclockwise until each of the cam lines are aligned with its corresponding spindle mark (see **Figure 34**).

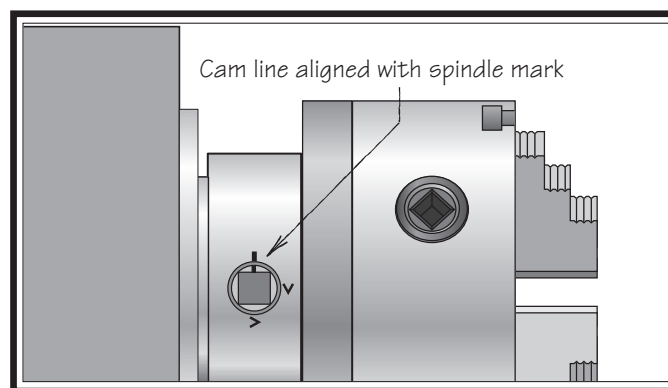


Figure 34. Camlock is fully loosened when the cam line is aligned with the spindle mark.

- Tip:** Camlocks can become very tight. A cheater pipe may be used as a last resort to add leverage when loosening. After loosening, you may need to wiggle the chuck key in the camlock to fully disengage the stud.
4. Using a dead blow hammer or other soft mallet, lightly tap around the outer circumference of the chuck body to loosen it from the spindle.
 5. Remove the chuck from the spindle, using a light rocking motion to carefully slide the studs out of the cam holes.
 - If the chuck does not immediately come off, rotate it approximately 60° and tap it again. Make sure all the marks on the cams and spindle are in proper alignment for removal.

Scroll Chuck Clamping 4-Jaw Chuck

This scroll-type chuck has an internal scroll-gear that moves all jaws in unison when adjusted with the chuck key. This chuck will hold cylindrical parts on-center with the axis of spindle rotation and can be rotated at high speeds if the workpiece is properly clamped and balanced.

Never mix jaw types or positions to accommodate an odd-shaped workpiece.

The chuck will spin out of balance and may throw the workpiece! Instead, use an independent jaw chuck or a faceplate.

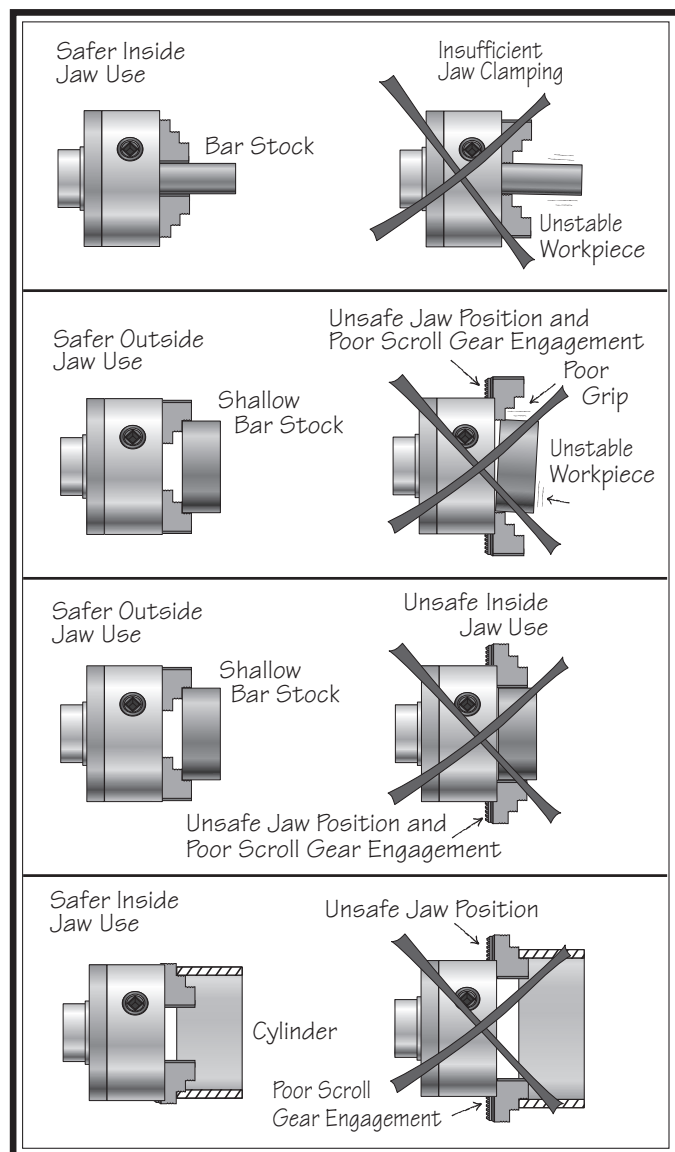


Figure 35. Jaw selection and workpiece holding.

Refer to the **Chuck Installation** (see **Page 38**) and **Chuck Removal** (see **Page 39**) instructions to install or remove the 4-jaw chuck.

The 4-jaw chuck features independently adjustable hardened steel jaws for holding non-concentric or off-center workpieces. Each jaw can be independently removed from the chuck body and reversed for a wide range of work holding versatility.

⚠ WARNING

Because of the dynamic forces involved in machining a non-concentric or off-center workpiece, always use a low spindle speed to reduce risk of the workpiece coming loose and being thrown from the lathe, which could cause death or serious personal injury.

Mounting Workpiece

1. DISCONNECT LATHE FROM POWER!
2. Place a chuck cradle or plywood on the bedway below the chuck to protect the bedway surfaces.
3. Use the chuck key to open each jaw so the workpiece will lay flat against the chuck face, jaw steps, or into the spindle opening.
4. With help from another person or a holding device, position the workpiece so it is centered in the chuck.

5. Tighten each jaw in small increments. After you have adjusted the first jaw, continue tightening the remaining jaws in an opposing sequence, as shown by the sequential order in **Figure 36**.

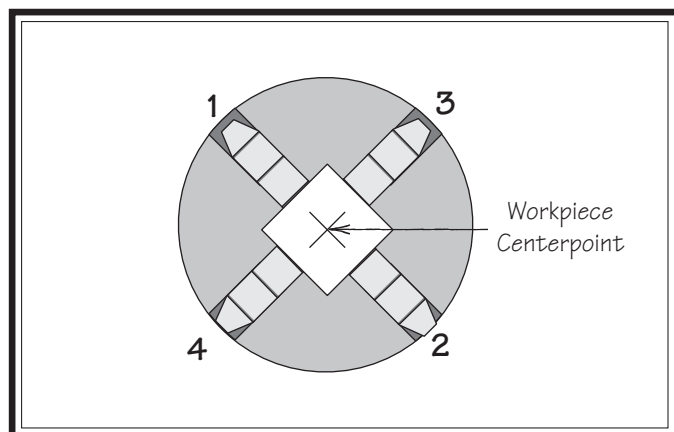


Figure 36. 4-jaw tightening sequence.

6. After the workpiece is held in place by the jaws, use a dial indicator to make sure the workpiece is centered in the chuck.
- If the workpiece is not correctly centered, make fine adjustments by slightly loosening one jaw and tightening the opposing jaw until the workpiece is correctly positioned (see **Figure 37** for an example).



Figure 37. Example photo of non-cylindrical workpiece correctly mounted on the 4-jaw chuck.

Faceplate

Refer to the **Chuck Installation (Page 38)** and **Chuck Removal (Page 39)** instructions to install or remove the faceplate.

The faceplate included with your lathe can be used for a wide range of operations, including machining non-concentric workpieces, straight turning between centers, off-center turning, and boring.

The tools needed for mounting a workpiece will vary depending on the type of setup you have.

!WARNING

Machining non-concentric workpieces at a high speed could cause the workpiece to be thrown from the spindle with deadly force at the operator or bystanders. To reduce this risk, only machine non-concentric workpieces at low speeds and clamp counter-weights to the faceplate to balance it.

!WARNING

Failure to properly secure a workpiece to the faceplate could cause the workpiece to be thrown from the lathe with deadly force at the operator or bystanders. Use a minimum of THREE independent clamping devices to hold the workpiece onto the faceplate.

To mount a non-concentric workpiece to the faceplate:

1. DISCONNECT LATHE FROM POWER!
2. Protect the bedway with a piece of plywood.
3. With help from another person or a holding device to support the workpiece, position it onto the faceplate and clamp it in place with a minimum of three independent clamping devices (see **Figure 38** for an example).

Be sure to take into account the rotational and cutting forces that will be applied to the workpiece when clamping it to the faceplate. If necessary, use counter-weights to balance the assembly and use a dial indicator to make sure that the workpiece is properly positioned for your operation.

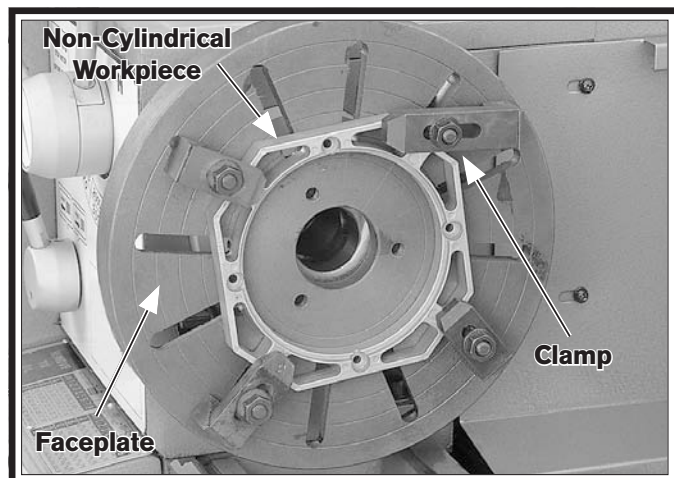


Figure 38. Example photo of workpiece clamped in a faceplate.

Tailstock

The tailstock (see **Figure 39**) is typically used to support long workpieces by means of a live or dead center (refer to **Centers** on **Page 46**). It can also be used to hold a drill or chuck to bore holes in the center of a part. Custom arbors and tapers can also be cut on your lathe by using the offset tailstock adjustment.

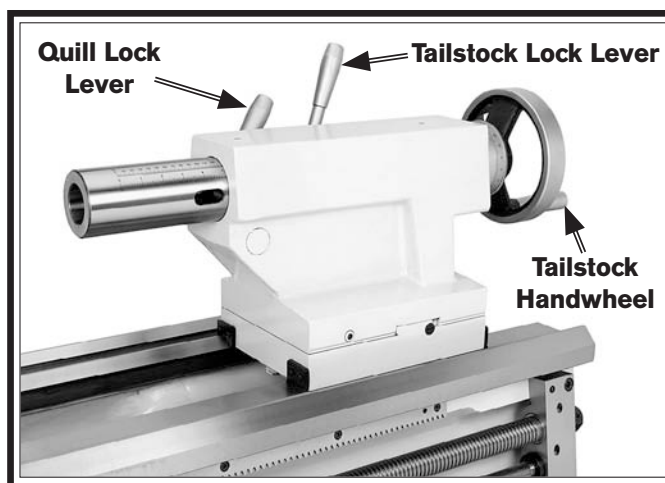


Figure 39. Tailstock and quill lock levers in locked position.

Graduated Dial

Increments.....	0.001"
One Full Revolution.....	0.100"

Increments on Quill

Inch.....	0"-6" in 1/8" Increments
Metric.....	0-160mm in 1mm Increments

Positioning Tailstock

1. Pull the tailstock lock lever backward (away from the spindle) to unlock the tailstock from the bedway.
2. Slide the tailstock to the desired position.
3. Push the tailstock lock lever forward (toward the spindle) to lock the tailstock against the bedway.

Using Quill

1. Move the quill lock lever toward the spindle to unlock the quill.
2. Turn the tailstock handwheel clockwise to move the quill toward the spindle or counterclockwise to move it away from it.
3. Move the lock lever away from the spindle to secure the quill in place.

Installing Tooling

This tailstock uses a quill with an MT#5 taper that has a lock slot in the back of the bore that accepts tang arbors and drill bits (see **Figures 40–41** for examples).

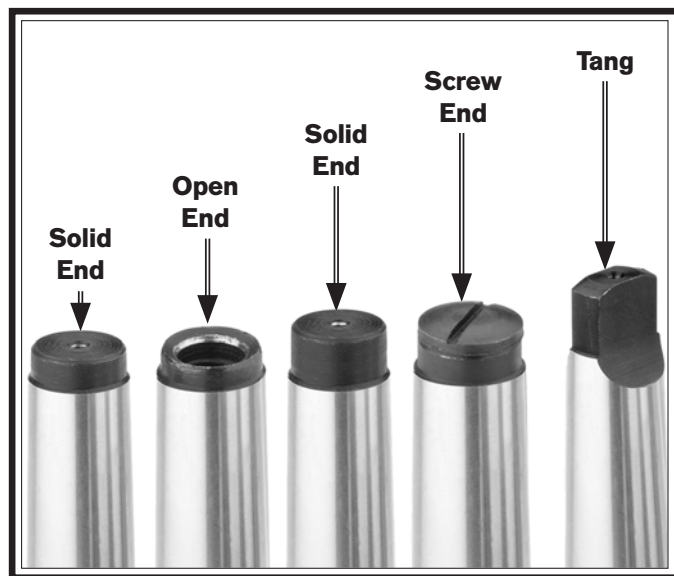


Figure 40. Types of tapered arbors and tooling.

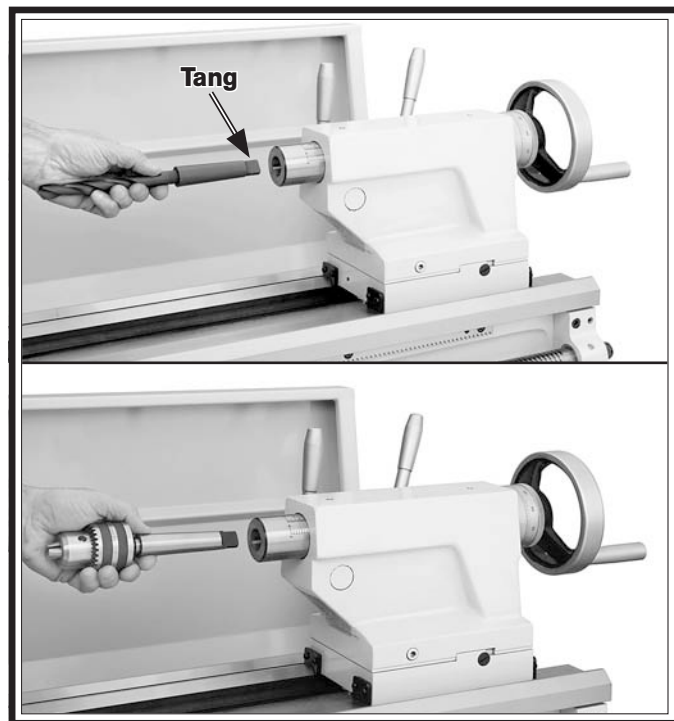


Figure 41. Example photos of inserting MT#5 tools with tangs into the tailstock.

However, other tooling without tangs, such as the four remaining tools shown in **Figure 40**, can still be used if the potential load will not exceed the strength of the tapered fit. For example, this includes smaller drill chucks, drill bits, and centers.

Note: If the tooling has an open hole in the end but is too short to be exposed in the drift slot for removal, then a screw can be threaded into the end of the tool to provide a solid surface for the quill pin to push against when the quill is retracted for tool removal. Otherwise, removal of such tooling may be difficult.

To install tooling in the tailstock:

1. With the tailstock locked in place, unlock the quill, then use the handwheel to extend it approximately 1".
2. Thoroughly clean and dry the tapered mating surfaces of the quill and the center, making sure that no lint or oil remains on the tapers.

Note: If the tapered tool shaft has a tang, align it with the slot in the back of the quill before seating it.

3. With a firm and quick motion, insert the tool into the quill. Check to see if it is firmly seated by attempting to twist it—a firmly seated tool will not twist.
4. Unlock the tailstock and move it until the tip of the tool is close to, but not touching, the workpiece, then re-lock the tailstock.
5. Start spindle rotation, unlock the quill, then turn the tailstock handwheel clockwise to feed the tool into the workpiece.

Removing Tooling

1. Use a shop rag to hold the tool.
2. Rotate the tailstock handwheel counterclockwise until the tool is forced out of the quill.

— If the tool does not come loose by retracting the quill, extend the quill and use a drift key in the slot shown in **Figure 42** to remove the tool.



Figure 42. Drift key slot in the side of the quill.

Offsetting Tailstock

The tailstock can be offset from the spindle centerline for turning tapers. Move the tailstock top casting toward the front of the lathe to machine a taper at the tailstock end. Conversely, position the tailstock top casting toward the back of the lathe to machine a taper at the spindle end.

Note: The marks on the offset indicator are arbitrary. For a precise offset, use a dial indicator to check quill movement while adjusting the screws.

Tools Needed

Qty

Hex Wrench 6mm	1
Wrench 17mm	1

To offset the tailstock:

1. Loosen the hex bolts underneath both ends of the tailstock to release the clamping pressure between the top and bottom castings (see **Figure 43**).

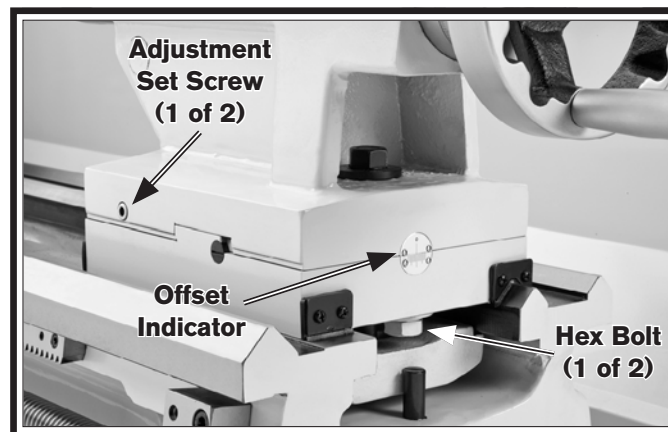


Figure 43. Tailstock offset controls.

2. Rotate the adjustment set screws in opposite directions for the desired offset (see the illustration in **Figure 44**).

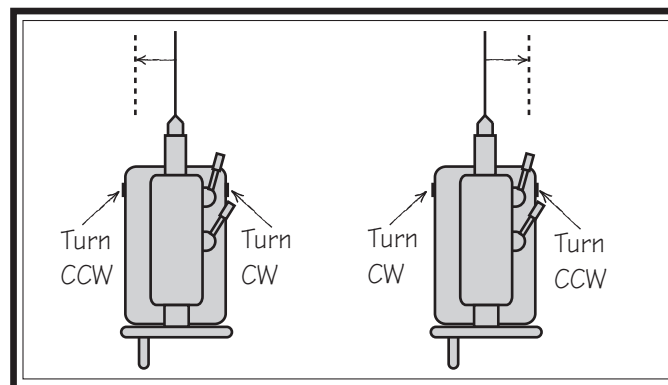


Figure 44. Set screw adjustment in relation to tailstock movement.

3. Retighten the clamping hex bolts underneath the tailstock to secure the offset.

Aligning Tailstock to Spindle Centerline

This is an essential adjustment that should be verified or performed each time the tailstock is used to turn concentric workpieces between centers or immediately after offsetting the tailstock when turning a taper. If the tailstock is not aligned with the spindle centerline when it is supposed to be, turning results will be inaccurate along the length of the workpiece.

Items Needed	Qty
Hex Wrench 6mm	1
Wrench 17mm	1
Round Stock 2" x 6"	2
Precision Level	1

To align the tailstock to the spindle centerline:

- Use the precision level to make sure the bedway is level from side-to-side and from front-to-back.
 - If the bedway is not level, correct this condition before continuing with this procedure (refer to **Leveling & Mounting** on Page 28).
- Center drill both ends of one piece of round stock, then set it aside for use in **Step 5**.
- Use the other piece of round stock to make a dead center, and turn it to a 60° point, as illustrated in **Figure 45**.

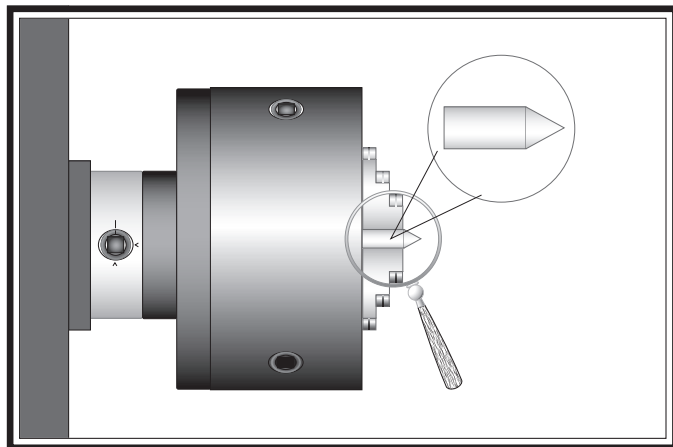


Figure 45. Turning a dead center.

Note: As long as this dead center remains in the chuck, the point of the center will remain true to the spindle centerline. The point will have to be refinished whenever the center is removed and then returned to the chuck.

- Install a center in the tailstock.
- Attach a lathe dog to the test stock from **Step 2**, then mount it between the centers (see **Figure 46** for an example).



Figure 46. Example photo of stock mounted between the centers.

- Turn 0.010" off the stock diameter.
- Mount a test or dial indicator so that the plunger is on the tailstock quill.

Note: If necessary in the following step, refer to **Offsetting Tailstock** on **Page 44** for detailed instructions.

8. Use calipers to measure both ends of the workpiece.
 - If the test stock is *thicker* at the tailstock end, move the tailstock toward the *front* of the lathe $\frac{1}{2}$ the distance of the amount of taper (see **Figure 47**).

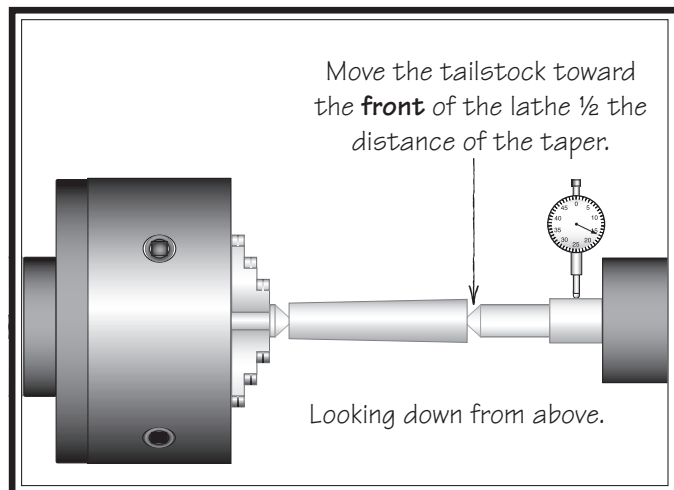


Figure 47. Adjust tailstock toward the operator.

- If the test stock is *thinner* at the tailstock end, move the tailstock toward the *back* of the lathe $\frac{1}{2}$ the distance of the amount of taper (see **Figure 48**).

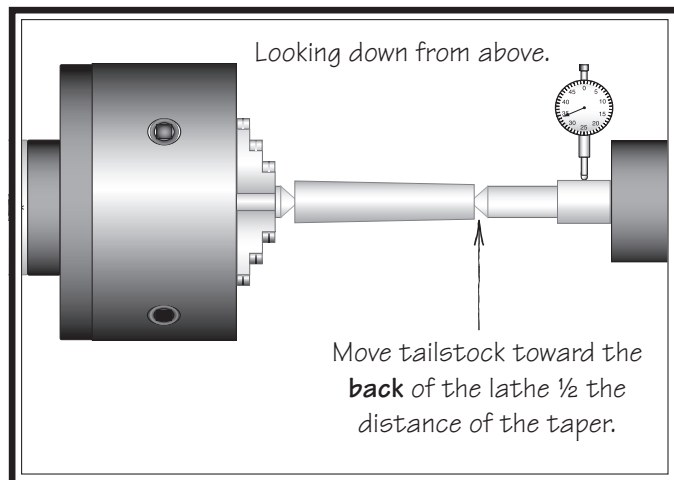


Figure 48. Adjust tailstock away from the operator.

9. Repeat **Steps 6–8** until the desired accuracy is achieved.

Centers

Figure 49 shows the MT#5 dead centers included with the lathe. In addition, an MT#7–MT#5 tapered spindle sleeve is included for mounting centers in the spindle.

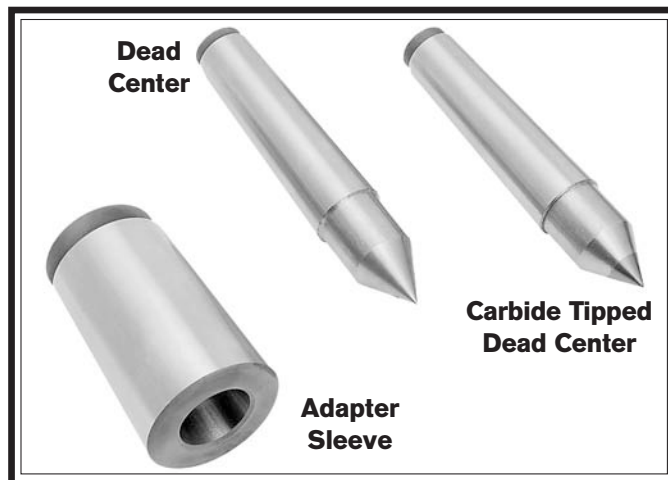


Figure 49. Adapter sleeve and dead centers.

Dead Centers

A dead center is a one-piece center that does not rotate with the workpiece and is used to support long, slender workpieces.

Use the dead center in the spindle for operations where the workpiece rotates with the center and does not generate friction.

The carbide-tipped dead center can better withstand the effects of friction and is best used in the tailstock where the workpiece will rotate against it. The tip of the center must be generously lubricated during the operation to avoid premature wear and maximize smooth operation. Using low spindle speeds will also reduce the heat and wear from friction.

Live Centers

A live center has bearings that allow the center tip and the workpiece to rotate together; it can be installed in the spindle and the tailstock quill for higher speeds. However, a live center typically does not provide the same level of rigidity as a dead center, and final workpiece accuracy can suffer as a result.

Mounting Dead Center in Spindle

1. DISCONNECT LATHE FROM POWER!
2. Thoroughly clean and dry the tapered mating surfaces of the spindle bore, adapter sleeve, and the center, making sure that no lint or oil remains on the tapers.

Note: This will prevent the tapered surfaces from seizing due to operational pressures, which could make it very difficult to remove the center.

3. Mount a chuck or faceplate onto the spindle, whichever is correct for your operation.
4. Insert the center into the sleeve, then insert the sleeve into the spindle bore through the chuck or faceplate.

Figure 50 shows an example photo of a dead center installed in the spindle, using a lathe dog and faceplate for turning between centers.

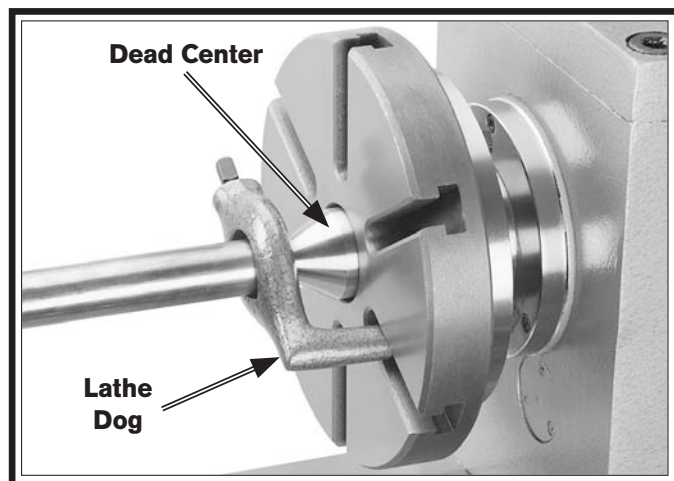


Figure 50. Example photo of using a dead center with a faceplate and lathe dog.

Removing Center from Spindle

To remove the sleeve and center from the spindle, insert a piece of round bar stock or similar tool through the outboard end (on the left side of the headstock). Have another person hold onto the sleeve and center with a gloved hand or shop rag, then tap the sleeve loose.

NOTICE

To avoid premature wear of the dead center or damage to the workpiece, use low spindle speeds and keep the tip of the dead center mounted in the tailstock well lubricated.

Mounting Center in Tailstock

Either a carbide-tipped dead center or live center can be used in the tailstock. Mounting instructions are the same for both. **Figure 51** shows an example photo of a dead center mounted in a tailstock.

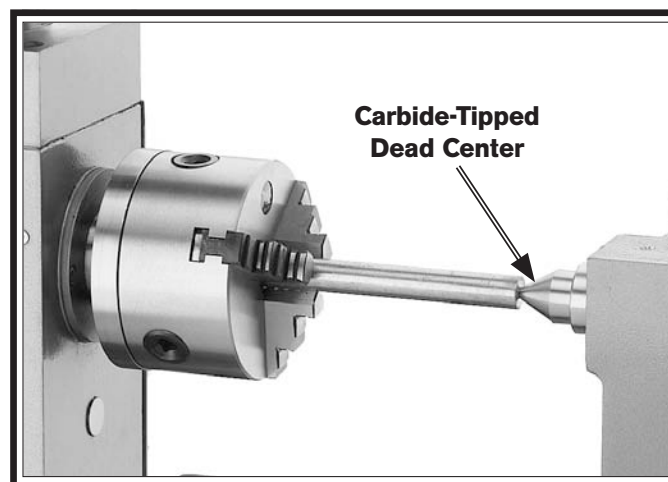


Figure 51. Example photo of using a carbide-tipped dead center installed in the tailstock.

To mount a center in the tailstock:

1. DISCONNECT LATHE FROM POWER!
2. Thoroughly clean and dry the tapered mating surfaces of the tailstock quill bore and the center, making sure that no lint or oil remains on the tapers.

- Use the tailstock handwheel to feed the quill out from the casting approximately 1".

Note: Do not extend the quill more than 2" or stability and accuracy will be reduced.

- Insert the center into the tailstock quill.
- Seat the center firmly into the quill during workpiece installation by rotating the quill handwheel clockwise to apply pressure, with the center engaged in the center hole in the workpiece.

Note: Only apply enough pressure with the tailstock quill to securely mount the workpiece between centers. Avoid overtightening the center against the workpiece, or it may become difficult to remove later, and it will result in excessive friction and heat, which may damage the workpiece and center.

Removing Center from Tailstock

To remove the center from the quill, hold onto it with a gloved hand or shop rag, then rotate the tailstock handwheel counterclockwise to draw the quill back into the casting until the center releases.

If the center does not come loose by retracting the quill, extend the quill to expose the slot shown in **Figure 52**, then use a drift key to remove the center.

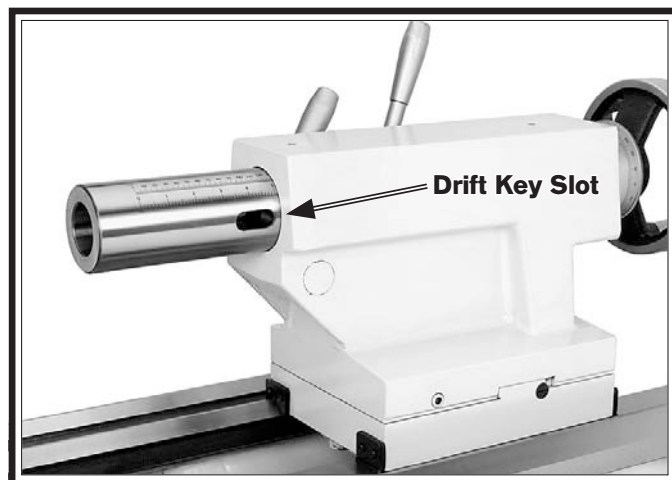


Figure 52. Drift key slot in the side of the quill.

Mounting Workpiece Between Centers

- DISCONNECT LATHE FROM POWER!**
- Drill center holes in both ends of the workpiece.
- Install a dead center in the spindle with a lathe dog and a chuck or faceplate, then install a live center or carbide-tipped dead center in the tailstock.
- Lubricate the workpiece center holes, then mount the workpiece between the centers and hold it in place with light pressure from the tailstock center.
- Seat the center firmly into the quill by rotating the tailstock handwheel clockwise to apply pressure against the workpiece (see the example in **Figure 53**).

Only apply enough pressure to securely mount the workpiece between centers. Avoid over-tightening the center against the workpiece, or it may become difficult to remove later. Also, over-tightening will result in excessive friction and heat, which may damage the workpiece or center.



Figure 53. Example photo of a workpiece mounted between the centers.

Steady Rest

The steady rest supports long shafts and can be mounted anywhere along the length of the bedway.

Familiarize yourself with the steady rest components shown in **Figure 54** to better understand its operation.

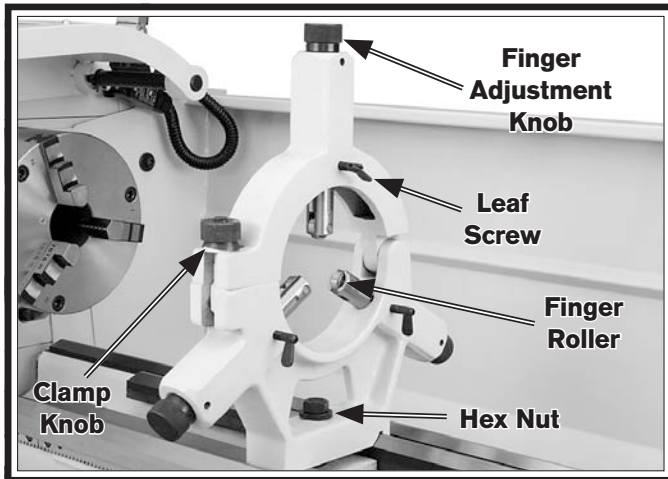


Figure 54. Steady rest components.

To install and use the steady rest:

1. DISCONNECT LATHE FROM POWER!
2. Thoroughly clean all mating surfaces, then place the steady rest base on the bedways so the triangular notch fits over the bedway prism.
3. Position the steady rest where required to properly support the workpiece, then tighten the hex nut shown in **Figure 54** to secure it in place.

4. Loosen the clamp knob that secures the two halves of the steady rest and open the top portion, as shown in **Figure 55**.

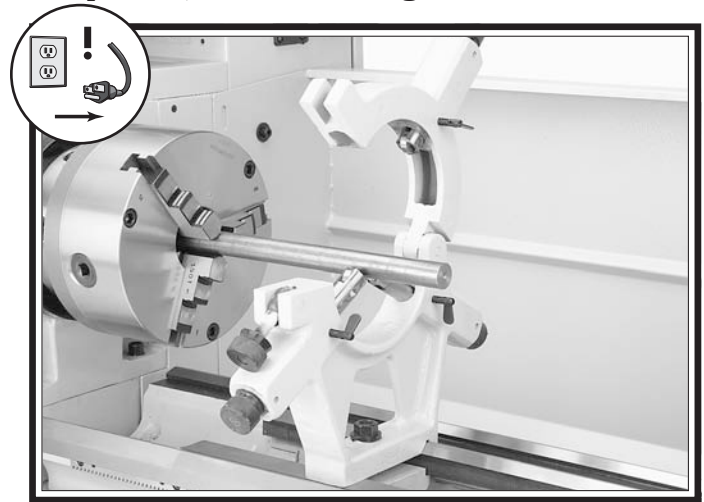


Figure 55. Workpiece mounted in the steady rest.

5. Loosen the three leaf screws so the finger roller positions can be adjusted.
6. Use the finger adjustment knobs to position the bottom two finger rollers against the workpiece, as shown in the example of **Figure 55**.

7. Close the steady rest, then use the finger adjustment knobs to adjust all three finger rollers so that they just touch the workpiece without causing deflection.

Note: The finger rollers should properly support the workpiece along the spindle centerline while still allowing it to freely rotate.

8. Tighten the three leaf screws to secure the settings.

Follow Rest

The follow rest mounts to the saddle with two cap screws (see **Figure 56**). It is used on long, slender parts to prevent workpiece deflection from the pressure of the cutting tool during operation. Adjust the follow rest fingers in the same manner as the those on the steady rest.

Note: To reduce the effects of friction, lubricate the brass finger tips with generous lubricant during operation.

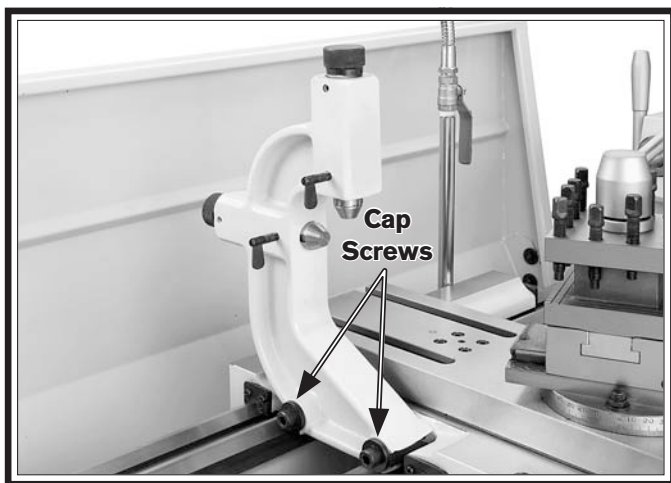


Figure 56. Follow rest attachment.

Carriage & Compound Rest Locks

The carriage and compound rest have locks that can be tightened to provide additional rigidity during operation, especially during heavy cuts.

See **Figure 57** to identify the locations of the locks for each device.

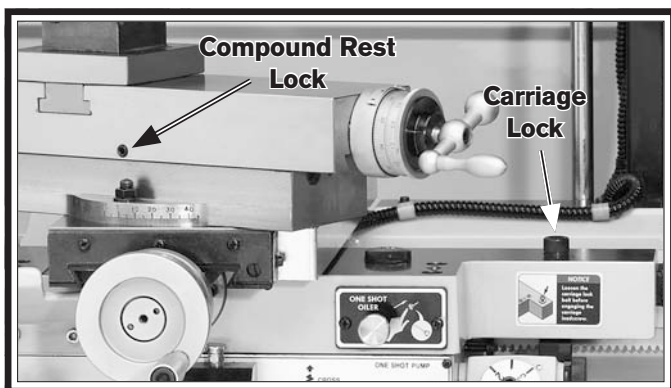


Figure 57. Compound rest and carriage locks.

Compound Rest

The compound rest handwheel has an indirect-read graduated scale. This means that the distance shown on the scale represents the actual distance the cutting tool moves. The base of the compound rest has another graduated scale used for setting the cutting tool to a specific angle.

Graduated Dial

Increments.....0.001" (0.02mm)
 One Full Revolution.....0.100" (2.54mm)

Tool Needed

Qty

Wrench 14mm 1

To set the compound rest at a certain angle:

1. Loosen the two hex nuts at the base of the compound rest (1 of 2 shown in **Figure 58**).

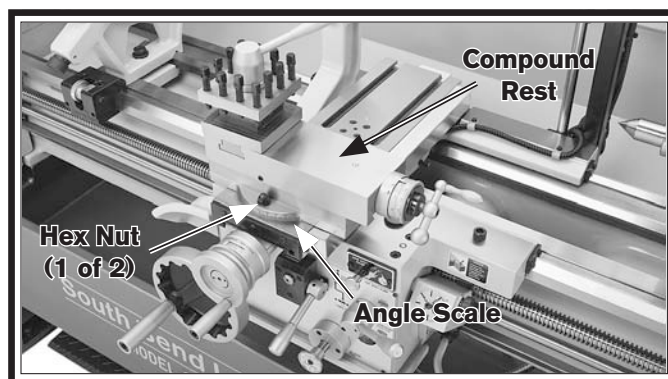


Figure 58. Compound rest.

2. Rotate the rest to the desired angle, as indicated by the scale at the base, then retighten the two hex nuts.

Tip: The first time you set the angle of the compound rest for cutting threads, mark the location on the cross slide as a quick reference point. This will allow you to quickly return the compound rest to that exact angle the next time you need to cut threads.

Four-Way Tool Post

The four-way tool post is mounted on top of the compound rest and allows a maximum of four tools to be loaded simultaneously.

Each tool can be quickly indexed to the workpiece by loosening the top handle, rotating the tool post to the desired position, then re-tightening the handle to lock the tool into position.

Installing Tool

Tool Needed

Tool Post T-Wrench.....	Qty
.....	1

To install a tool in the tool post:

1. Adjust the tool post bolts so that the cutting tool can fit underneath them (see **Figure 59**).

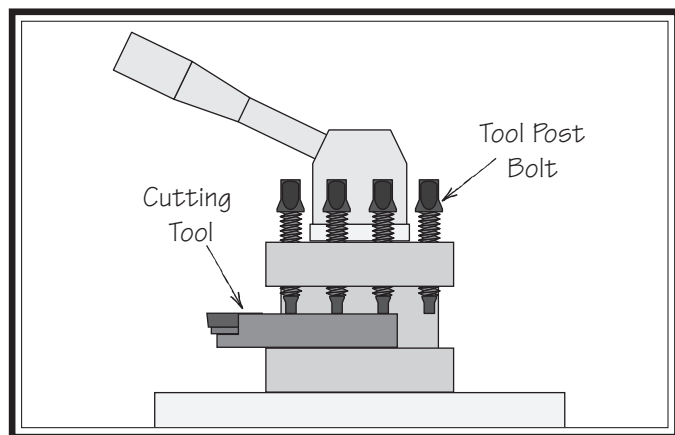


Figure 59. Example of tool mounted in tool post.

⚠ WARNING

Over-extending a cutting tool from the post will increase the risk of tool chatter, breakage, or tool loosening during operation, which could cause metal pieces to be thrown at the operator or bystanders with great force. DO NOT extend a cutting tool more than 2.5 times the width of its cross-section or less (e.g, 2.5 x 0.5" = 1.25").

2. Firmly secure the cutting tool with at least two tool post bolts.
3. Check and adjust the cutting tool to the spindle centerline, as instructed in the next subsection.

Aligning Cutting Tool with Spindle Centerline

For most operations, the cutting tool tip should be aligned with the spindle centerline, as illustrated in **Figure 60**.

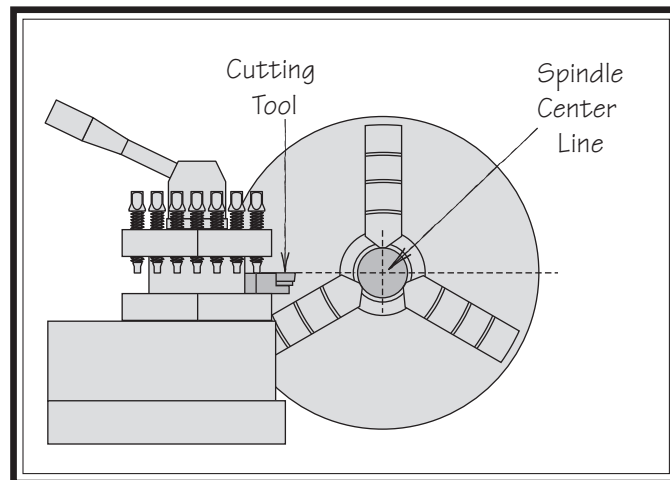


Figure 60. Cutting tool aligned with spindle centerline (viewed from tailstock).

There are a number of ways to check and align the cutting tool to the spindle centerline. If necessary, you can raise the cutting tool by placing steel shims underneath it. The shims should be as long and as wide as the cutting tool to properly support it.

Below are two common methods:

- Align the tip of the cutting tool with a center installed in the tailstock, as instructed on the next page. For this to work, the tailstock must be aligned to the spindle centerline (refer to **Aligning Tailstock To Spindle Centerline** on **Page 45** for detailed instructions).
- Make a facing cut on a piece of round bar stock. If the tool is above or below the spindle centerline, a nub will be left in the center of the workpiece. Adjust the height of the tool, then repeat the facing cut to check the adjustment. Repeat as necessary until the center of the workpiece face is smooth.

Tools Needed

	Qty
Tool Post T-Wrench.....	1
Steel Shims.....	As Needed
Cutting Tool.....	1
Fine Ruler.....	1
Tailstock Center.....	1

To align the cutting tool with the tailstock center:

1. Mount the cutting tool in the tool post, then secure the post so the tool faces the tailstock.
2. Install a center in the tailstock, and position the center tip near the cutting tool tip.
3. Lock the tailstock and quill in place.
4. Adjust the height of the cutting tool so that the tool tip is aligned vertically and horizontally with the center tip, as shown in **Figure 61**.

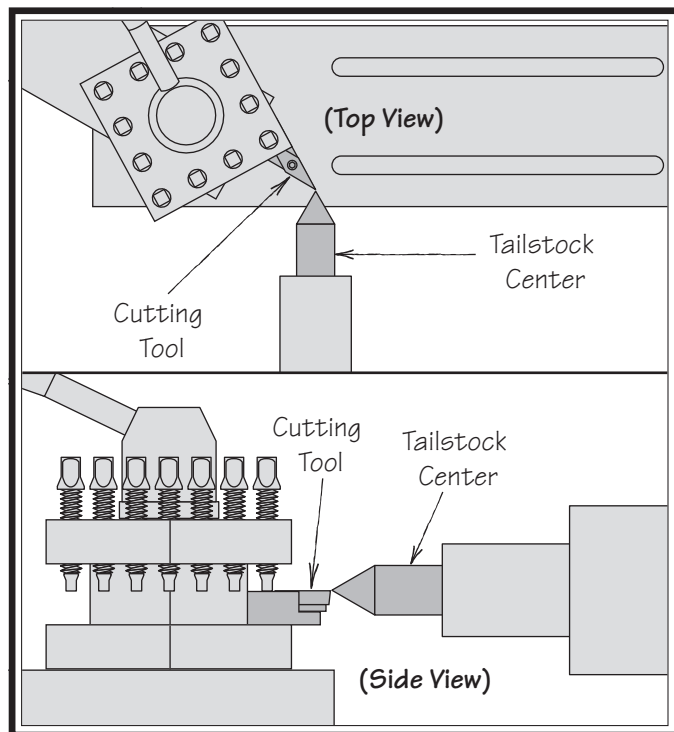


Figure 61. Cutting tool tip aligned with tailstock center.

Micrometer Stop

The micrometer stop is used to limit carriage travel for production runs or make final adjustments to the carriage position.

If power feed is being used and the carriage clutch is correctly adjusted, the carriage will disengage from the feed rod when it contacts the micrometer stop and movement will stop. Refer to **Carriage Clutch Knob** on **Page 56** for detailed instructions on adjusting the carriage clutch.

NOTICE

The micrometer stop is not designed to stop carriage movement when the leadscrew is engaged for threading operations—doing so may damage the micrometer stop or lathe components.

Tools Needed

	Qty
Hex Wrench 8mm	1

To set the micrometer stop:

1. DISCONNECT LATHE FROM POWER!
2. Loosen the cap screws shown in **Figure 62**, then use the carriage handwheel to position the carriage and cutting tool at the desired stopping point.

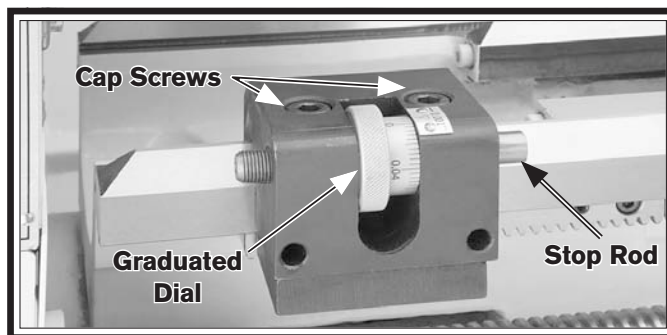


Figure 62. Micrometer stop.

3. Move the micrometer stop up to the carriage, use the graduated dial to fine tune the position, then retighten the cap screws loosened in **Step 2**.
4. Verify that tooling will not make contact with the chuck, jaws, or other components.

Manual Feed

The handwheels shown in **Figure 63** allow the operator to manually move the cutting tool.

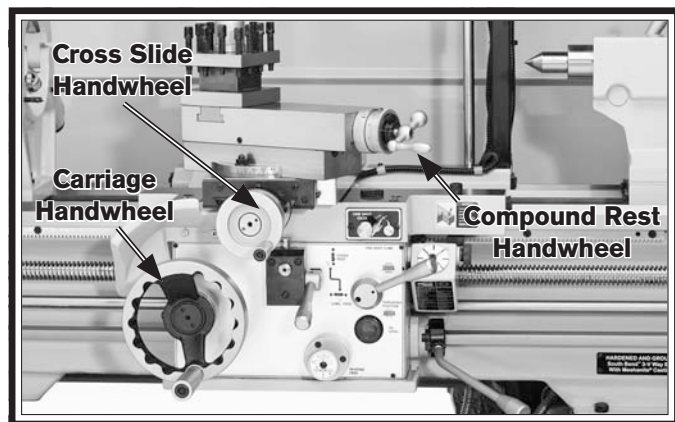


Figure 63. Carriage Controls.

Carriage Handwheel

The carriage handwheel moves the carriage left or right along the bed. It has a graduated dial with 0.01" increments, and one full revolution moves the carriage 0.80". Pull the handwheel out to disengage it during power feed operations—this will prevent entanglement hazards.

Cross Slide Handwheel

The cross slide handwheel moves the tool toward and away from the work. Adjust the position of the graduated scale by holding the handwheel with one hand and turning the dial with the other. The cross slide handwheel has a direct-read graduated dial, which shows the total amount of material removed from the diameter of the workpiece (i.e., half the amount of tool movement). The dial has 0.001" (0.02mm) increments, and one full revolution moves the slide 0.100" (5.08mm). Rotate the dial collar 180° to read in metric units.

Compound Rest Handwheel

The compound rest handwheel moves the cutting tool linearly along the set angle of the compound rest. The compound rest angle is set by hand-rotating it and securing in place with two hex nuts. The compound rest has an indirect-read graduated dial with 0.001" (0.02mm) increments. One full revolution of the handwheel moves the slide 0.100" (2.54mm). Rotate the dial collar 180° to read in metric units.

Spindle Speed

Using the correct spindle speed is important for safe and satisfactory results, as well as maximizing tool life.

To set the spindle speed for your operation, you will need to: 1) Determine the best spindle speed for the cutting task, and 2) configure the lathe controls to produce the required spindle speed.

Determining Spindle Speed

Many variables affect the optimum spindle speed to use for any given operation, but the two most important are the recommended cutting speed for the workpiece material and the diameter of the workpiece, as noted in the formula shown in **Figure 64**.

<p>*Recommended Cutting Speed (FPM) x 12</p> <hr/> <p>Dia. of Cut (in inches) x 3.14</p> <p>= SpindleSpeed (RPM)</p> <p>*Double if using carbide cutting tool</p>

Figure 64. Spindle speed formula for lathes.

Cutting speed, typically defined in feet per minute (FPM), is the speed at which the edge of a tool moves across the material surface.

A recommended cutting speed is an ideal speed for cutting a type of material in order to produce the desired finish and optimize tool life.

The books **Machinery's Handbook** or **Machine Shop Practice**, and some internet sites, provide excellent recommendations for which cutting speeds to use when calculating the spindle speed. These sources also provide a wealth of additional information about the variables that affect cutting speed and they are a good educational resource.

Also, there are a large number of easy-to-use spindle speed calculators that can be found on the internet. These sources will help you take into account the applicable variables in order to determine the best spindle speed for the operation.

Setting Spindle Speed

1. Make sure the spindle is turned *OFF* and it has come to a complete stop.
2. Use the chart in **Figure 65** to determine the available spindle speed range that includes your calculated spindle speed.

SPINDLE SPEED RANGES	RPM
Low Speed Range 1	18–55
Medium Speed Range 2	55–180
Medium-High Speed Range 3	180–600
High Speed Range 4	600–1800

Figure 65. Spindle speed ranges.

3. Move the spindle speed range lever to the range that covers your calculated spindle speed.
- Note:** To shift the spindle speed range lever, you may need to rock the chuck by hand to get the gears to mesh.
4. Turn the spindle speed dial shown in **Figure 66** all the way counterclockwise to set it to the minimum speed.

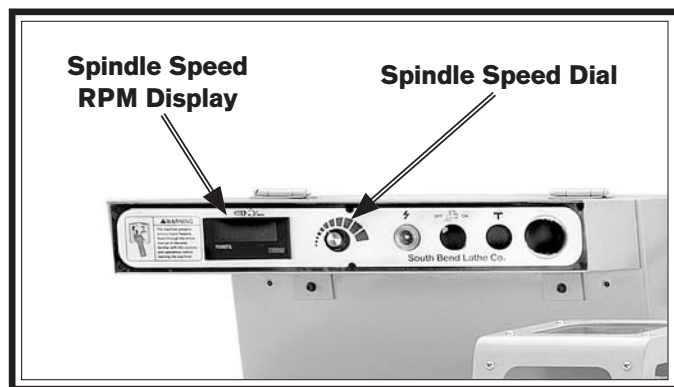


Figure 66. EVS spindle speed controls.

NOTICE

Always make sure the variable speed dial is turned all the way down (counterclockwise) before starting spindle rotation. This will help the operator remain in better control if spindle rotation must be stopped immediately after start-up for emergency reasons.

NOTICE

Operating the lathe at spindle speeds higher than 350 RPM could result in gearbox damage when the high (H) gearbox range is selected. Always use spindle speeds of 350 RPM or lower when using a high gearbox range.

5. Turn the spindle *ON*, and slowly turn the spindle speed dial to your calculated spindle speed.

Power Feed

Both the carriage and cross slide have power feed capability when the carriage is engaged with the feed rod. The rate that these components move (feed rate) is controlled by the headstock and quick-change gearbox lever positions, and the end gear configuration.

Feed rate and spindle speed must be considered together. Keep in mind that the feed rate is expressed in the amount of travel per revolution of the spindle. The sources you use to determine the optimum spindle speed for an operation will also provide the optimal feed rate to use with that spindle speed.

Often, the experienced machinist will use the feeds and speeds given in their reference charts or web calculators as a starting point, then make minor adjustments to the feed rate (and sometimes spindle speed) to achieve the best results.

The carriage can alternatively be driven by the leadscrew for threading operations. However, this section only covers the use of the power feed option for the carriage and cross slide components for non-threading operations. To learn how to power the carriage for threading operations, refer to **Threading on Page 59**.

Power Feed Controls

Use **Figures 67–71** and the following descriptions to become familiar with the locations and functions of the controls that you will use to set up the correct power feed for your operation.

Note: Before using power feed, you may have to re-configure the end gears, depending on how they are set up. Refer to **End Gears on Page 58** for detailed instructions.

Gearbox Range Lever: Selects the low or high feed rate range by re-aligning the headstock transfer gear. In the middle position, disables power feed (see **Figure 67**).

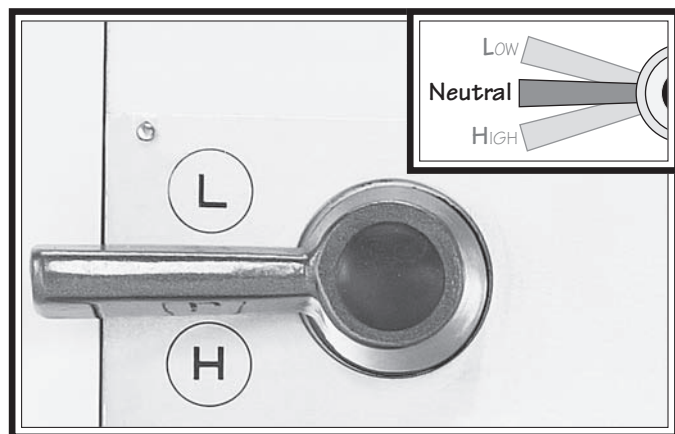


Figure 67. Gearbox range lever.

NOTICE

Operating the lathe at spindle speeds higher than 350 RPM could result in gearbox damage when the high (H) gearbox range is selected. Always use spindle speeds of 350 RPM or lower when using a high gearbox range.

Headstock Feed Direction Lever: Selects the direction of power feed (see **Figure 68**).

Note: The spindle must be stopped to use this lever. When the lathe is running, use the apron feed direction knob.

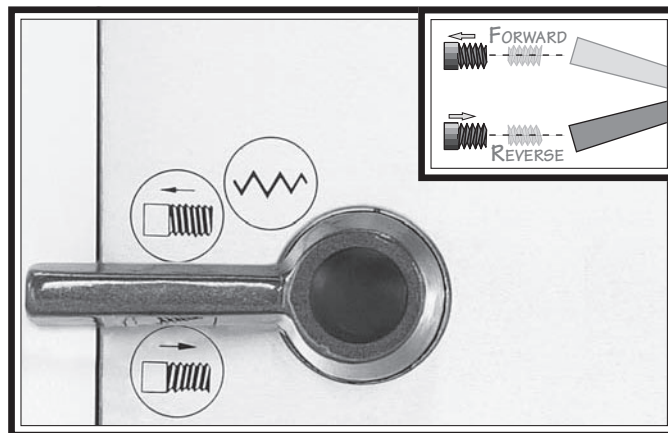


Figure 68. Headstock feed direction lever.

Quick-Change Gearbox Feed Levers: Configure the quick-change gearbox gears for the feed rate selected per the feed chart (see **Figure 69**).

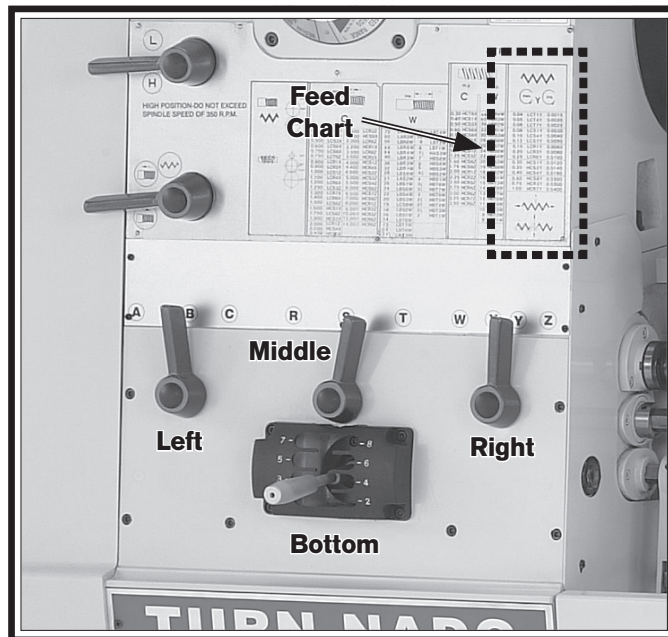


Figure 69. Quick-change gearbox controls.

Feed Selection Knob: Selects the carriage or cross slide for power feed (see **Figure 70**).

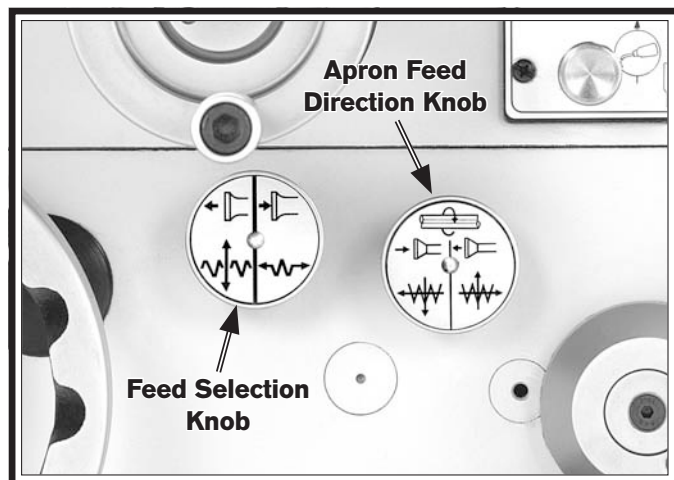


Figure 70. Apron feed selection and direction knobs.

When the knob is pulled out, the cross slide is selected. Conversely, when the knob is pushed in, the carriage is selected.

In the middle position, the apron gears are disengaged from the feed rod and neither component will move.

Note: When using this control, you may need to rock the handwheel of the component being engaged so that the apron gears will mesh.

Apron Feed Direction Knob: Changes power feed direction (see **Figure 70**).

The advantage of this knob is that you can quickly reverse power feed direction while the spindle is rotating—without having to turn the lathe off and use the feed direction lever on the headstock.

NOTICE

Depending on the combined configuration of the feed direction lever on the headstock and the feed direction knob on the apron, the actual direction of power feed may be different from the printed indicators on the machine!

Carriage Clutch Knob: Adjusts how easily the carriage clutch will disengage automatic feeding when the carriage contacts a feed stop or in the event of a crash. Tightening this knob all the way disables the carriage clutch completely. (see **Figure 71**).

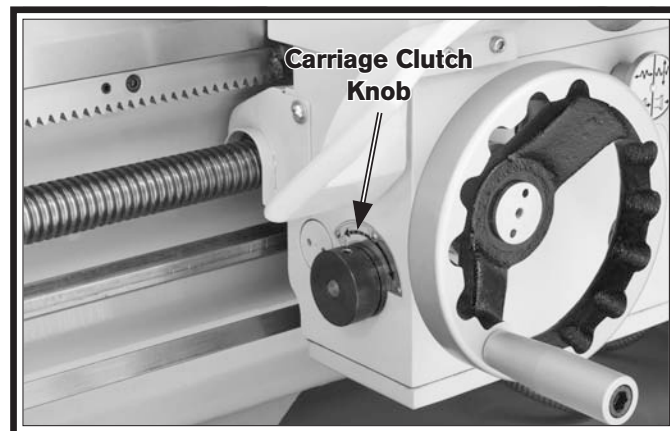


Figure 71. Adjustable carriage clutch knob.

The carriage clutch serves two purposes: 1) It disengages the carriage feed when the carriage contacts a feed stop, providing a precise repeatable stopping point; and (2) it provides a safety factor in the event of an accidental overload or crash.

The correct carriage clutch setting will depend on variables of the operation, such as workpiece material, depth of cut, power feed rate, and others. Finding this clutch setting is a matter of trial-and-error and experience.

For a starting point of clutch adjustment, rotate the carriage clutch knob clockwise until it is tight, then back it off counterclockwise three full revolutions. This is a reasonably conservative setting to start with. If necessary, further adjust the knob for the setting that is right for your operation.

NOTICE

The carriage clutch will not stop carriage movement when it is engaged with the leadscrew for threading.

If the carriage clutch knob is completely tight (all the way clockwise), it will be disabled, which will not allow it to help prevent damage in event of a crash.

Setting Power Feed Rate

The power feed rate chart displays the settings for the headstock feed controls for metric and inch feed rates (see **Figure 72**).

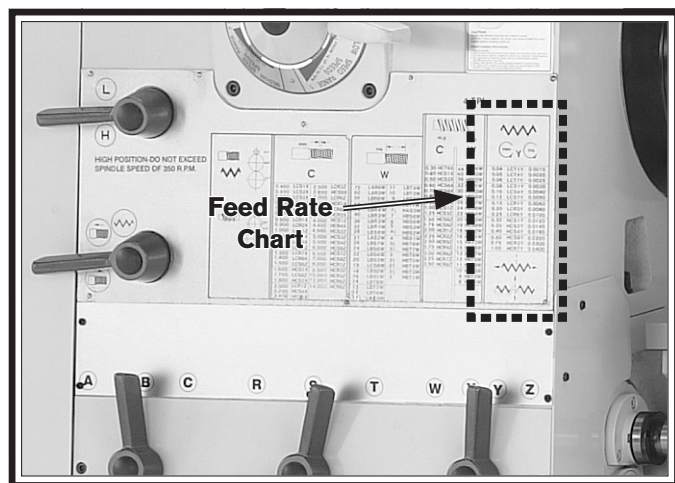


Figure 72. Power feed rate chart.

Using the controls on the lathe, follow along with the example below to better understand how to set the lathe for the desired power feed rate.

Example: Power Feed Rate of 0.0025"/rev

1. Make sure the end gears are in the standard configuration, which is applicable for general feed operations (refer to **End Gears** on the **Page 58** for detailed instructions).
2. Locate the line in the feed rate chart that lists the setting for 0.0025" of feed per revolution of the spindle, as illustrated in **Figure 73**.

n. p.		d. p.		mm		ins	
C	W	mm	ins	mm	ins	mm	ins
HCT6X	44 HBR4W	0.04	LCT1Y	0.0015			
HCS1X	40 HBR3W	0.05	LCT4Y	0.0020			
HCS3X	36 HBR2W	0.06	LCT7Y	0.0025			
HCS6X	32 HBR1W	0.08	LCS1Y	0.0030			
HCS8X	30 HAS3W	0.10	LCS4Y	0.0040			
HCR1X	28 HBS8W	0.12	LCS7Y	0.0050			
HCR2X	26 HBS7W	0.15	LCR1Y	0.0060			
HCS1Z	24 HBS6W	0.20	LCR3Y	0.0080			
HCS3Z	22 HBS4W	0.25	LCR6Y	0.0100			
HCS6Z	20 HBS3W	0.30	HCS1Y	0.0120			
HCS8Z	19 HCS8W	0.35	HCS2Y	0.0140			
HCR1Z	18 HBS2W	0.40	HCS4Y	0.0160			
HCR2Z	16 HBS1W	0.50	HCS8Y	0.0200			
HCR3Z	15 HAT3W	0.75	HCR3Y	0.0300			
HCR4Z	14 HBT8W	1.00	HCR7Y	0.0400			
HCR6Z	13 HBT7W						

Figure 73. Feed rate chart.

Note: In the next step, use the chuck key to rock the spindle back and forth to help mesh the gears as you make adjustments.

3. For a power feed rate of 0.0025"/rev., use the configuration string of characters to the left of the selected feed rate (LCT7Y) to configure the controls as follows:

- L** Move the gearbox range lever on the headstock up to the low position.
- C** Point the left gearbox lever to "C".
- T** Point the middle gearbox lever to "T".
- 7** Position the bottom gearbox lever in slot "7".
- Y** Point the right gearbox lever to "Y".

The lathe is now set up for a power feed rate of 0.0025" per spindle revolution.

NOTICE

When using power feed to move the cross slide, the feed rate is 1/2 the value stated in the feed rate chart.

End Gears

The end gears on the side of the headstock can be setup for the standard or alternate configuration, depending upon the type of operation to be performed. The lathe is shipped with the end gears in the standard configuration.

To access the end gears, remove the end gear cover from the left side of the headstock

Standard End Gear Configuration

Use the standard end gear configuration (see **Figure 74**) for inch threading, metric threading, and all general feed operations.

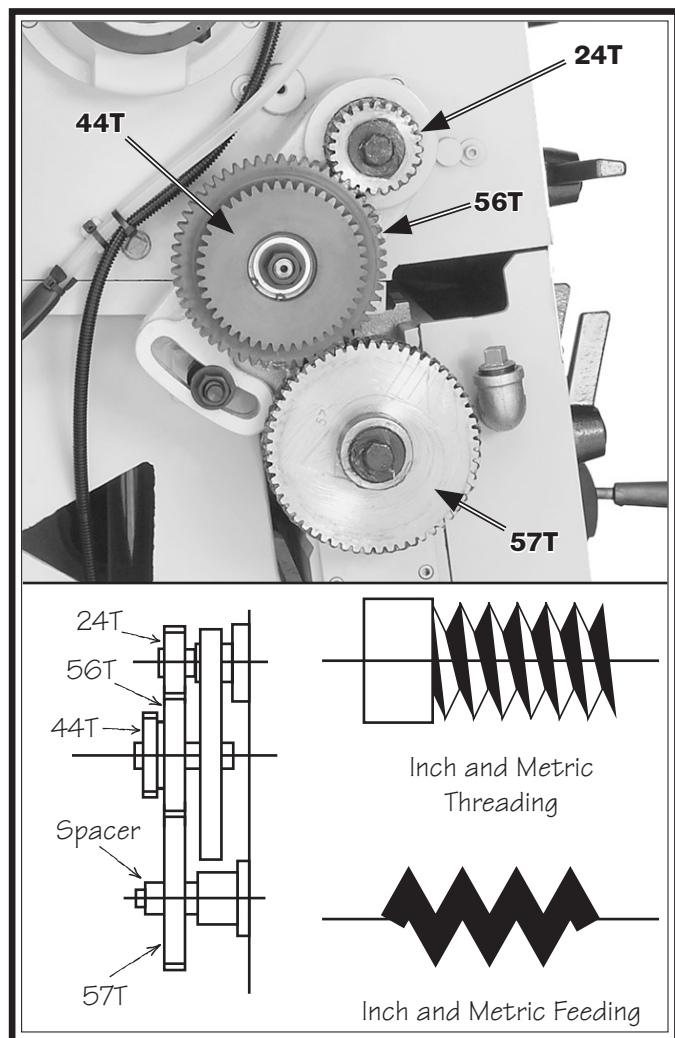


Figure 74. End gears in the standard configuration.

Alternate End Gear Configuration

Use the alternate end gear configuration when cutting modular or diametral pitches, as illustrated in **Figure 75**.

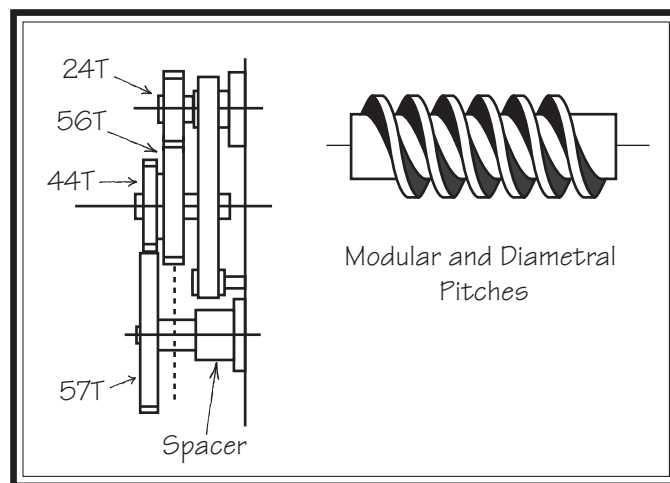


Figure 75. Alternate end gear configuration.

Configuring End Gears

Tools Needed	Qty
Hex Wrench 6mm	1
Wrench 22mm	1

To configure the end gears:

1. DISCONNECT LATHE FROM POWER!
2. Remove the end gear cover from the left side of the headstock.
3. Remove the cap screw, lock washer, and flat washer from the 57 tooth end gear (see **Figure 76**).

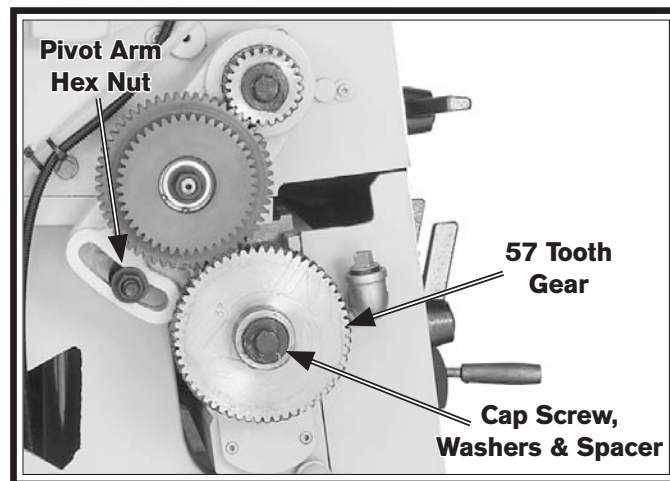


Figure 76. End gear components.

- Loosen the pivot arm hex nut shown in **Figure 76**, then swing the pivot arm to the left so that the 44T/56T gears are away from the 57T gear. Hand tighten the hex nut to keep the arm in place.

NOTICE

As you remove and replace end gears, use a stiff brush and mineral spirits to clean away the debris and grime from them, then re-lubricate them as instructed in End Gears on Page 74.

- Making sure to keep the shaft key firmly seated, remove the spacer and the 57T gear, then re-install them as follows:
 - For the standard end gear configuration, slide the 57T gear on first, then the spacer on the outside.
 - For the alternate end gear configuration, slide the spacer on first, then the gear.
- Re-install the cap screw, lock washer, and flat washer you removed in **Step 3** to secure the spacer and 57T gear. Do not overtighten.
- Slide the pivot arm back so that either the 44T or the 56T meshes with the 57T gear, then retighten the pivot arm hex nut.

Note: Make sure to keep approximately 0.002" play between the gears.

- Replace and secure the end gear cover before re-connecting the lathe to power.

Threading Controls

The following subsections describe how to use the threading controls and charts on this lathe. If you are unfamiliar with the process of cutting threads on a lathe, we strongly recommend that you read books, review industry trade magazines, or get formal training before doing any threading projects.

Headstock & Gearbox Threading Controls

The threading charts on the headstock face display the settings for metric and inch threading, and modular and diametral pitches.

For inch or metric threads, use the standard end gear configuration. For modular or diametral pitches, use the alternate configuration

Use the controls on the lathe and follow along with the example below to better understand how to set up the lathe for the desired threading operation.

Example: Metric Thread Pitch of 2.5mm

- Make sure the end gears are in the standard configuration, which is used for all metric threading (refer to **End Gears on Page 58** for detailed instructions).
- Locate the line in the metric thread chart that lists the setting for 2.5mm threads, as illustrated in **Figure 77**.

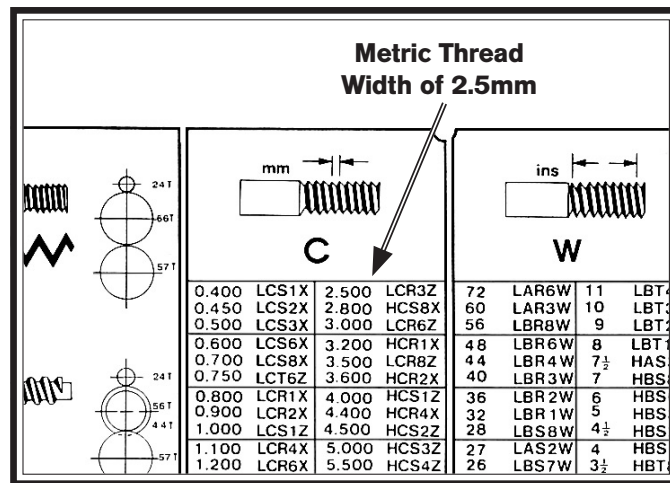


Figure 77. Metric thread chart.

Note: In the next step, use the chuck key to rock the spindle back and forth to help mesh the gears as you make adjustments.

3. For a metric thread pitch of 2.5mm, use the configuration string of characters to the right of the selected thread pitch (**LCR3Z**) to position the threading controls as follows:
 - L** Move the gearbox range lever to the low position.
 - C** Point the left gearbox lever to the **C**.
 - R** Point the middle gearbox lever to the **R**.
 - 3** Position the bottom gearbox lever in the **3** slot.
 - Z** Point the right gearbox lever to **Z**.

The lathe is now setup to cut a 2.5mm thread pitch.

Apron Controls

The half nut lever engages the apron with the leadscrew which moves the carriage and cutting tool along the length of the workpiece for threading operations (see **Figures 78–79**).

Important: Make sure the feed control lever is in the disengaged (middle) position before attempting to engage the half nut.

NOTICE

Attempting to engage the half nut while the cross slide or carriage is engaged with the feed rod could cause severe damage to the lathe. Never attempt to engage the half nut while the feed control lever is engaged.

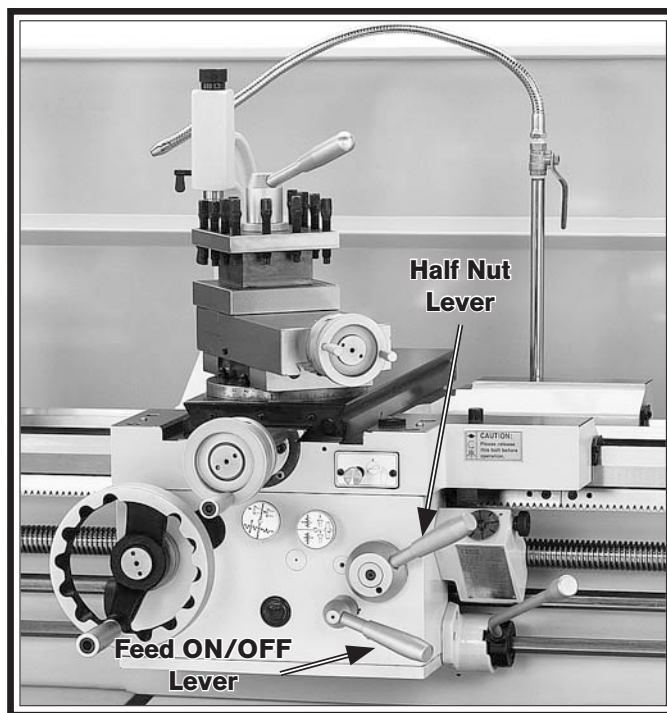


Figure 78. Carriage controls.

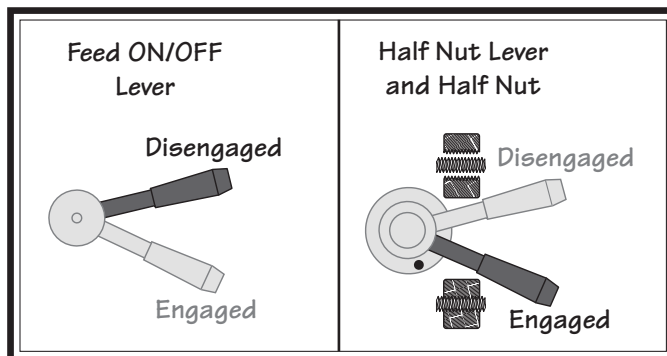


Figure 79. Feed ON/OFF lever and half nut positions for threading.

Thread Dial

The numbers on the thread dial are used with the thread dial chart to show when to engage the half nut during inch threading. The thread dial gear must be engaged with the leadscrew for this to work. Loosen the knurled knob on the thread dial, pivot the dial gear toward the leadscrew so that it properly meshes with the leadscrew threads, then re-tighten the knob, as shown **Figure 80**.

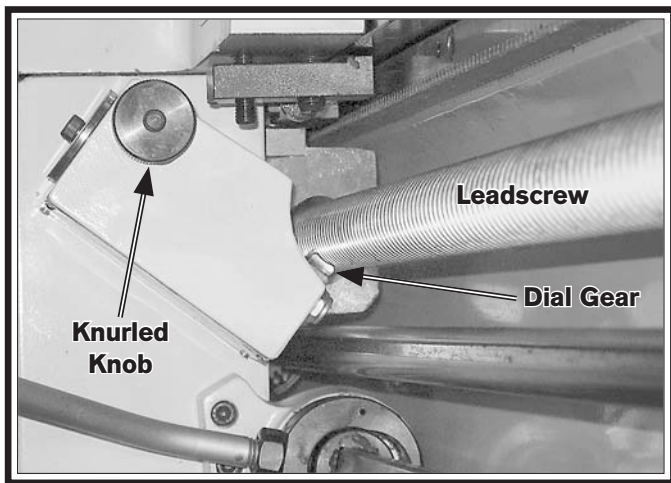


Figure 80. Thread dial engaged with the leadscrew.

NOTICE

When threading, we recommend using the slowest speed possible and avoiding deep cuts, so you are able to disengage the half nut when required and prevent an apron crash!

Thread Dial Chart

Find the TPI (threads per inch) that you want to cut in the left column of the thread dial chart (see **Figure 81**), then reference the dial number to the right of it. The dial numbers indicate when to engage the half nut for a specific thread pitch. The thread dial chart can also be found on the front of the thread dial housing.



In. 	
4,8,12,16,20,24, 28,32,36,40,44, 48,56,60,72	Any Position
2,6,10,14, 18,22,26, 30,54	Non- Numbered Position
3,5,7,9, 11,13,15, 19,23,27	Numbered Position 1,2,3,4
2½,3½,4½, 7½,11½,13½	Position 1,3 or 2,4
2¼,2¾, 3¼,3¾	Position 1 Only
2⅞	Same as Metric Threads

Figure 81. Thread dial chart.

Note: The thread dial is not used for metric threading, or diametral and modular pitches. You must leave the half nut engaged from the beginning until the turning is complete for these types of operations.

The following examples explain how to use the thread dial chart.

TPI Divisible By 4

For threading a TPI that is divisible by four, use any line on the thread dial (see **Figure 82**).


TPI		
4,8,12,16,20,24, 28,32,36,40,44, 48,56,60,72	Any Position	

Figure 82. Any position on the dial for threading TPI divisible by 4.

Even TPI Not Divisible By 4

For threading a TPI that is even but not divisible by 4, use any of the non-numbered lines on the thread dial (see **Figure 83**).

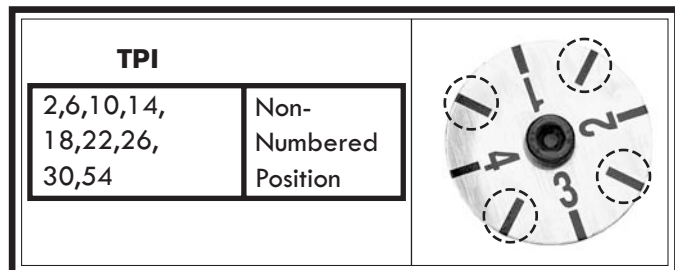


Figure 83. Marks are selected on the dial for threading even TPI not divisible by 4.

Odd Numbered TPI

For odd numbered TPI, use any of the numbered lines on the thread dial (see **Figure 84**).

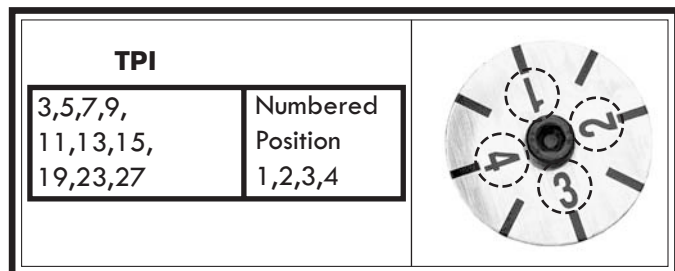


Figure 84. Numbers are selected on the dial for threading odd numbered TPI.

1/2 Fractional TPI

Use any opposing number pairs—2/4 or 1/3 on the thread dial for 1/2 fractional TPI (see **Figure 85**). For example, to cut a 3 1/2 thread, select 1 or 3 on the dial.

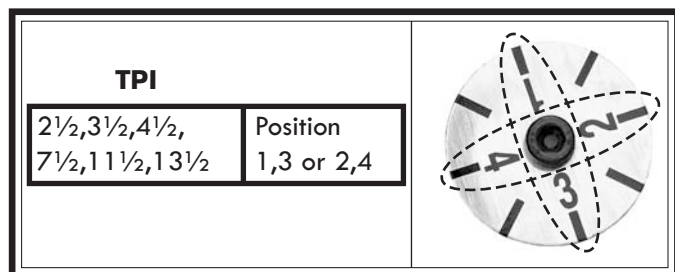


Figure 85. Opposing number group are selected on dial for cutting 1/2 thread TPI.

1/4 or 3/4 Fractional TPI

For TPI that have a 1/4 or 3/4 fraction, use position 1 on the thread dial (see **Figure 86**).

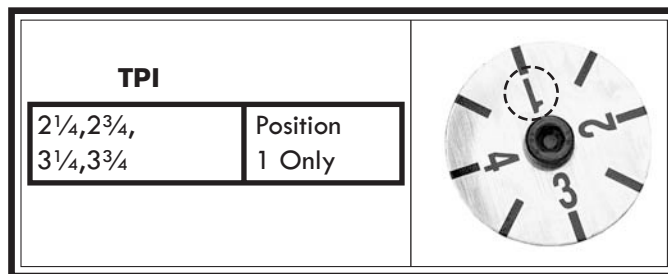


Figure 86. Position for 1/4 or 3/4 fractional TPI.

2 7/8 TPI

The thread dial is not used for 2 7/8 or metric threading, or diametral and modular pitches (see **Figure 87**). The half nut must stay engaged with the leadscrew throughout the entire threading operation.

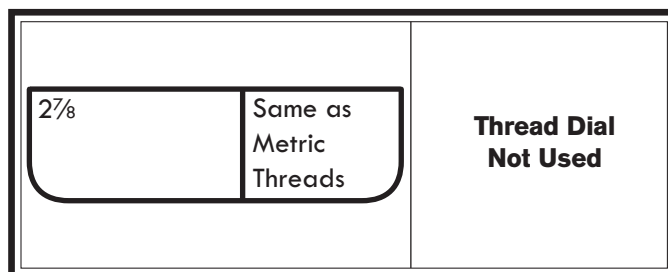


Figure 87. Half nut stays engaged for 2 7/8 TPI.

Chip Drawer

The chip drawer shown in **Figure 88** catches swarf and metal chips during the machining process. It slides open to provide access to swarf during cleanup.

Also, the chip drawer contains a screen that allows run-off coolant to drain back into the reservoir.



Figure 88. Chip drawer.

⚠ CAUTION

If pulled out quickly and more than halfway, the drawer could fall out and hit your legs and feet, causing impact injuries. Always open the drawer slowly and avoid opening it more than halfway.

Coolant System

When the coolant pump switch is turned **ON**, the fluid is delivered through the nozzle attached to the carriage. The flow is controlled by the valve lever at the base of the nozzle (see **Figure 89**).

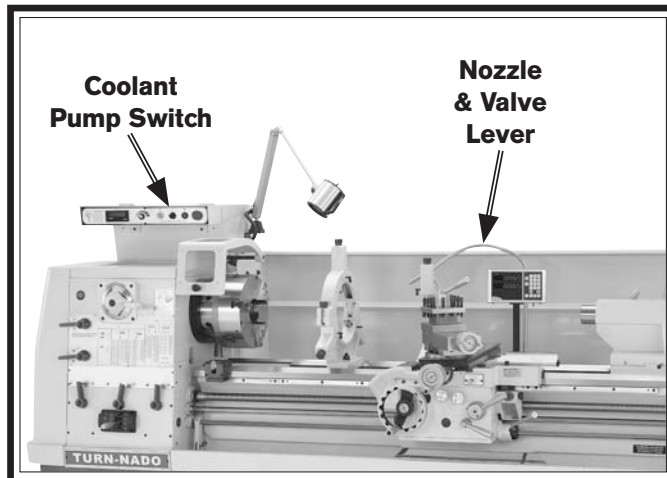


Figure 89. Coolant system controls.



Always use high quality coolant and follow the manufacturer's instructions for diluting. The quick reference table shown in **Figure 90** can help you select the appropriate fluid.

Refer to **Coolant System Service** on **Page 75** for detailed instructions on how to add or change fluid. Check the coolant regularly and promptly change it when it becomes overly dirty or rancid, or as recommended by the fluid manufacturer.

Workpiece	Dry	Water Soluble Oil	Synthetic Coolants	Sulferized Oil	Mineral Oil
Aluminum		X	X		
Brass	X	X	X		
Bronze	X	X	X		X
Cast iron	X				
Low Carbon Steel		X	X		
Alloy Metals		X	X	X	X
Stainless Steel		X	X	X	X

General Note: Coolants are used for heavy-duty lathe operations and production turning. Oil-water emulsions and synthetic cutting fluids are the most common for typical lathe operations. Sulferized oils often are used for threading. For small projects, spot lubrications can be done with an oil can or brush, or omitted completely.

Figure 90. Coolant selection table.

	<p>⚠ WARNING BIOLOGICAL & POISON HAZARD! Use the correct personal protection equipment when handling coolant. Follow federal, state, and fluid manufacturer requirements for proper disposal.</p>
	

NOTICE

Running the pump without adequate fluid in the coolant tank may permanently damage it, which will not be covered under warranty.

To use the coolant system on your lathe:

1. Make sure the coolant tank is properly serviced and filled with the appropriate fluid, and that you are wearing the necessary personal protection equipment.
2. Position the coolant nozzle for your operation.
3. Use the coolant pump switch on the control panel to turn the pump **ON**.
4. Adjust the flow of coolant by using the valve lever near the base of the nozzle hose.

Important: Promptly clean any splashed fluid from the floor to avoid a slipping hazard.

Rod Support

Models SB1043PF, SB1045PF, and SB1061PF include a rod support that gives additional reinforcement to the leadscrew and feed rod (see **Figure 91**).

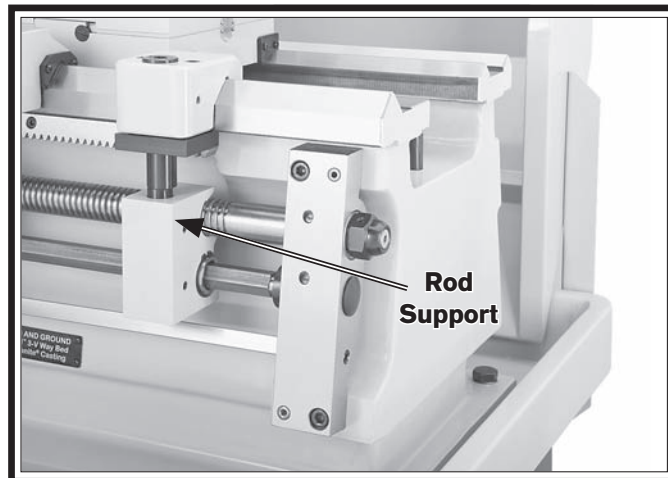


Figure 91. Rod support.

Ideally, the best position along the bed for the rod support is mid-way between the right end of the leadscrew and the farthest place toward the tailstock that the carriage will travel during the operation.

Use a 6mm hex wrench to loosen the cap screws that secure the clamp plate, position the rod support where desired, then re-tighten the cap screws.

NOTICE

To avoid lathe damage, make sure the carriage will not crash into the rod support when using longitudinal power feed.

Accessories

This section includes the most common accessories available for your lathe, which may be available through your local South Bend Lathe Co. dealer. If you do not have a dealer in your area, please call us at (360) 734-1540 or email us at cs@southbendlathe.com.

SB1279—10 Pc. Precision 5-C Collet Set

Set of 10 collets sized from $\frac{1}{8}$ " - $\frac{3}{4}$ ". Same quality as the individual collets, only packaged in one convenient set.



Figure 92. Model SB1279 10 Pc. 5-C Collet Set.

SB1272—Collect Attachment

This collet attachment takes advantage of the South Bend factory-made collet port in the lathe gear cover. This accessory installs easily on these South Bend Lathes without having to modify the gear cover. The Model SB1272 is capable of delivering years of trouble-free service. It is manufactured with the same high-quality workmanship, materials, and tolerances South Bend machinery is known for.

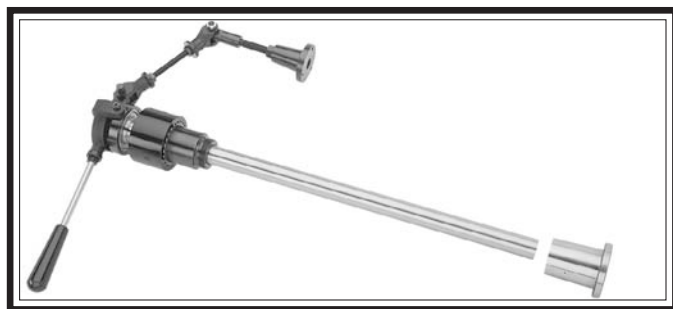


Figure 93. Model SB1272 Collect Attachment

SB1298—SBL Bench Lathe Shop Clock SB1299—SBL Toolroom Lathe Shop Clock SB1300—SBL Lathe with Man

These fine traditional shop clocks are constructed with a metal antique-finished frame. They are easy to read from a distance and measure 14" in diameter. Pictures just don't do them justice. They are very nice quality clocks and perfect for the South Bend Lathe aficionado.

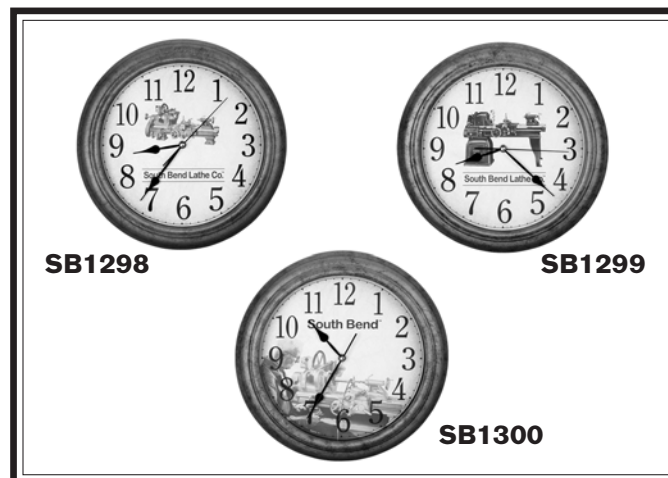


Figure 94. Antique-finished South Bend shop clocks.

SB1271—Taper Attachment

This taper attachment mounts quickly to the back bedway of your lathe. Accurate tapers of up to 12" can be produced without repositioning the attachment, having to offset the tailstock, or disengaging the cross slide nut. The Model SB1271 features scales at both ends, reading inches-per-foot and degrees. An angle adjusting knob with fine threads achieves exacting control when setting tapers.

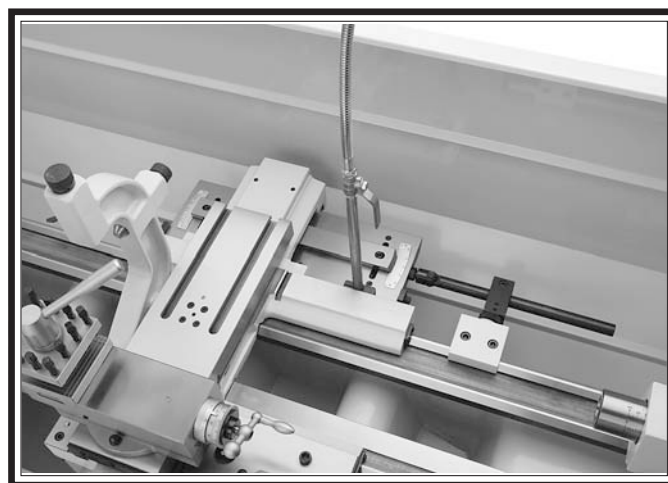
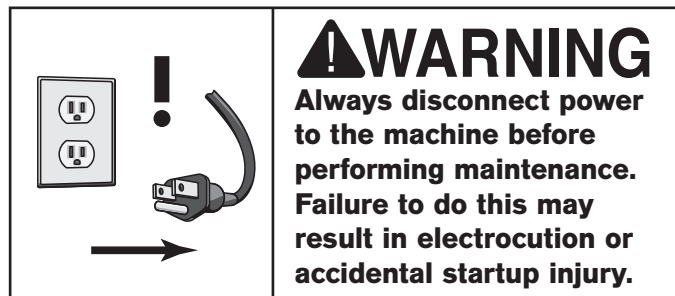


Figure 95. Model SB1271 Taper Attachment.

Maintenance Schedule



For optimum performance from this machine, this maintenance schedule must be strictly followed. We strongly recommend all operators make a habit of following the daily maintenance procedures. Use the chart provided on **Page 67** to ensure this is done.

Ongoing

The condition of machine components should be carefully observed at all times to minimize the risk of injury or machine damage. If any of the conditions below are observed, stop the lathe immediately, disconnect power, and correct the condition before resuming operations:

- Loose mounting bolts or fasteners.
- Worn, frayed, cracked, or damaged wires.
- Guards removed.
- STOP button not working correctly or not requiring you to reset it before starting the machine again.
- A reduction in braking speed or efficiency.
- Oil level not visible in the sight glasses.
- Coolant not flowing out.
- Damaged or malfunctioning components.

Daily, Before Operations

- Check/add headstock oil (**Page 68**).
- Check/add gearbox oil (**Page 71**).
- Check/add apron oil (**Page 71**).
- Check/add coolant (**Page 75**).
- Lubricate the ways (**Page 72**).
- Add oil to the ball oilers (**Page 73**).
- Clean/lubricate the leadscrew (**Page 73**).
- Disengage the feed control lever on the apron (to prevent crashes upon startup).
- Ensure carriage lock bolt is loose.

Daily, After Operations

- Depress STOP button and shut **OFF** the master power switch (to prevent accidental startup).
- Vacuum/clean all chips and swarf from bed, slides, and chip drawer.
- Wipe down all unpainted or machined surfaces with an oiled rag.

Monthly

- Drain and clean the coolant tank, then add new fluid (**Page 75**).

Annually

- Change the headstock oil (**Page 68**).
- Change the apron oil (**Page 71**).
- Change the gearbox oil (**Page 71**).
- Lubricate end gears (**Page 74**).
- Check/level bedway (**Page 28**).

Cleaning & Protecting

Regular cleaning is one of the most important steps in taking care of this lathe. We recommend that the cleaning routine be planned into the workflow schedule, so that adequate time is set aside to do the job right.

Typically, the easiest way to clean swarf from the bed ways and chip drawer is to use a wet/dry shop vacuum that is dedicated for this purpose. The small chips left over after vacuuming can be wiped up with a slightly oiled rag. Avoid using compressed air to blow off chips, as it may drive them deeper into moving surfaces and could cause sharp chips to fly into your face or hands.

Besides the ways, all other unpainted and machined surfaces should be wiped down daily to keep them rust-free and in top condition. This includes any surface that is vulnerable to rust if left unprotected (especially any parts that are exposed to water-soluble coolant). Typically, a thin film of oil is all that is necessary for protection.

Lubrication

Headstock

The headstock has a pressurized lubrication system that consists of an oil pump, an oil pressure safety switch, a supply tank, oil hoses, and a manifold with oil distribution lines. The oil distribution lines direct oil to key locations, such as the spindle bearings and upper headstock gearing, to ensure that they always remain well lubricated.

The oil pump automatically starts and begins lubricating the headstock components when the master power switch is turned **ON** and the STOP button is reset. This ensures the headstock bearings and gears are properly lubricated before the spindle is started to protect these components against damage from a dry start-up.

Review the lubrication system diagram illustrated in **Figure 96** to familiarize yourself with the function and relationship of the headstock oil system components.

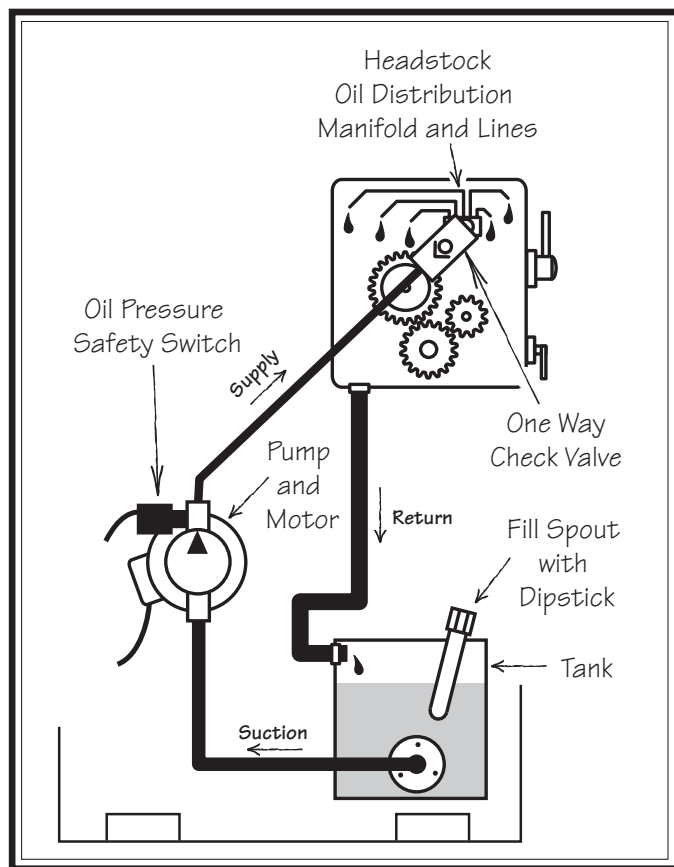


Figure 96. Lubrication system overview.

Oil Pressure Safety Switch

To prevent costly damage to the headstock gears and bearings from lack of adequate lubrication, an oil pressure safety switch (see **Figure 97**) is installed on the output side of the pump and will shut the lathe down if oil pressure is lost for any reason.

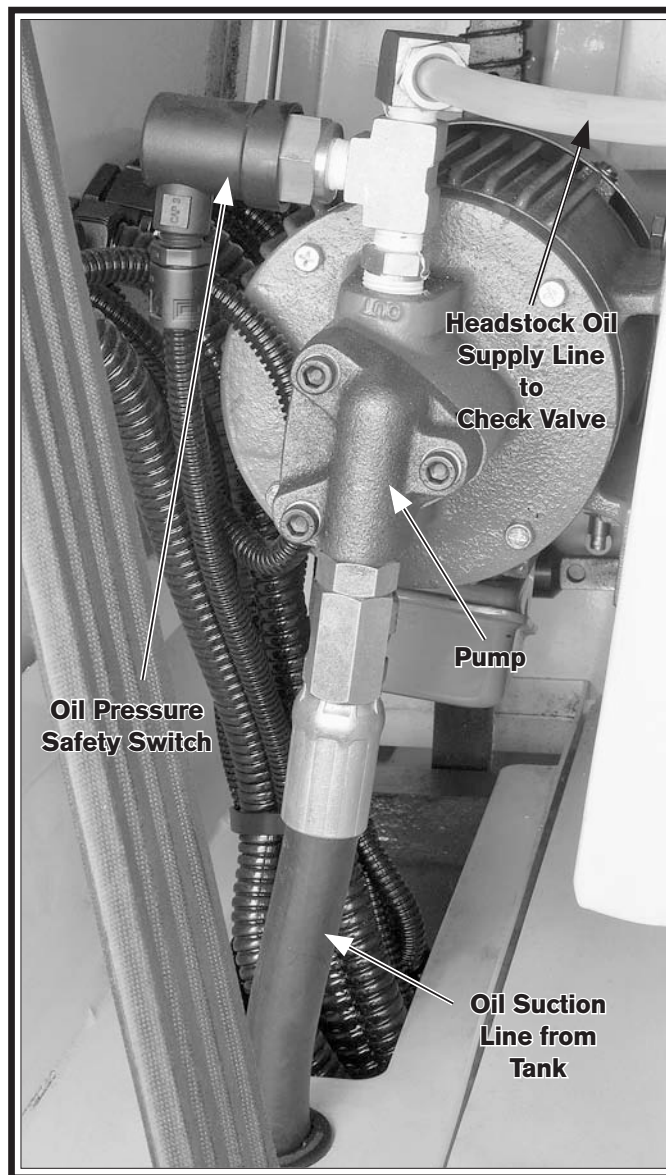


Figure 97. Oil pump and oil pressure safety switch.

NOTICE

If the headstock components are not adequately lubricated before and during operation, lathe damage could occur. Never bypass the oil pressure safety switch for any reason.

Checking & Adding Oil

Oil Type...Mobil DTE Light or ISO 32 Equivalent
 Oil Amount 15.9 Quarts
 Check/Add Frequency Daily
 Change Frequency Annually

Use the oil sight glass shown in **Figure 98** to verify that oil is being pumped into the headstock during operation. When the lathe is disconnected from power, no oil will be seen in the sight glass.

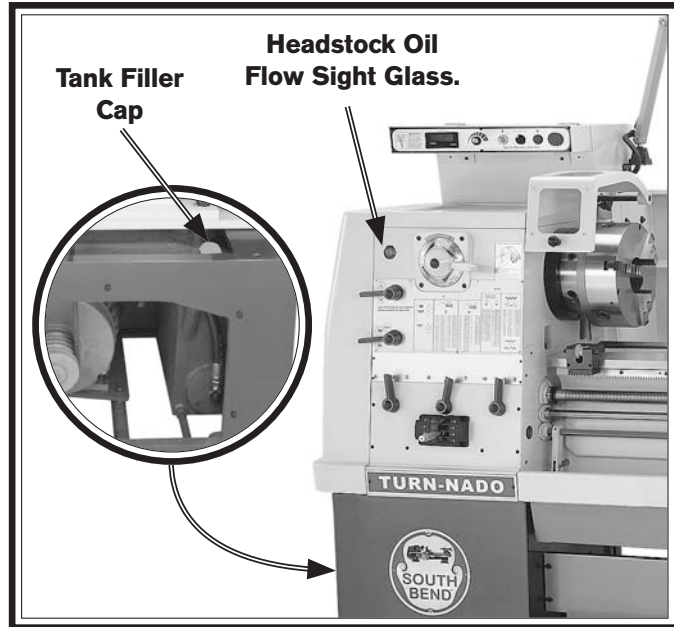


Figure 98. Headstock oil flow sight glass location.

The oil tank filler cap (see **Figure 98**) is fitted with a dip stick for checking the headstock oil level (see **Figure 99**). If the oil level is below the full zone on the dip stick, add oil to the tank to bring the level back into the full zone.

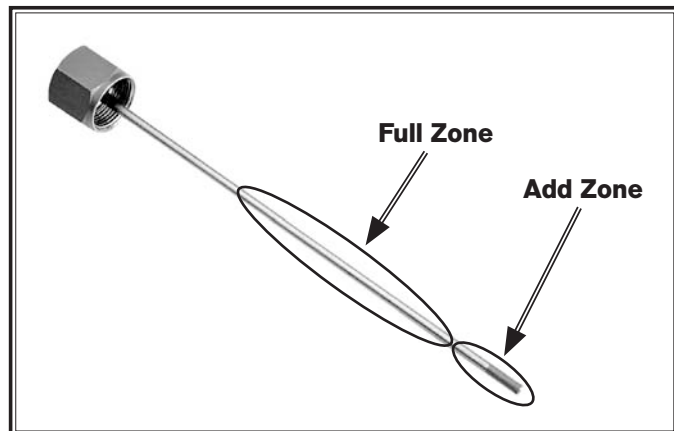


Figure 99. Headstock oil level dip stick.

Changing Headstock Oil

The headstock oil pump system must be cleaned and the oil changed after the break-in period and then annually (or every six months with heavy service or extreme working conditions).

Since this lathe uses a base-mounted oil tank, removing the drain plug and using a drain pan is not a convenient option when changing the oil. We recommend using a remote oil pump with a suction hose that can be inserted through the filler spout to the bottom of the oil tank instead.

If a remote oil pump system is not available, use the headstock oil pump for this purpose, as instructed below.

Items Needed:

	Qty
5-Gallon Waste Oil Bucket with Lid	1
Phillips Screwdriver #2	1
Standard Screwdriver #2.....	1
Funnel 8"	1
Hex Wrench 4mm	1
Wrench 17mm	1
Wrench 25mm	1
Wrench 1½"	1
Mineral Spirits	As Required
Rags	As Required
Gasket or Automotive Silicone Sealant	1
Hose Clamp	½" Diameter
Drain Hose.....	¾" ID x 4' Long
Magnets	Optional

To to change the headstock oil:

1. DISCONNECT LATHE FROM POWER!
2. Remove the end gear cover, the tank access cover, and the oil tank fill cap.
3. Remove the headstock oil supply line from the check valve (see **Figure 100**).

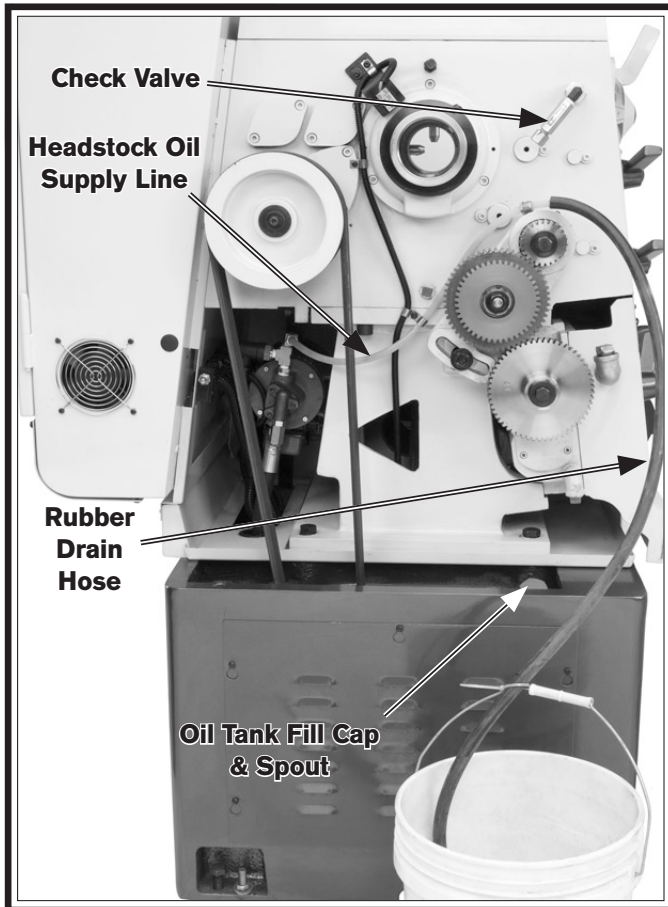


Figure 100. Draining headstock oil.

4. Push the drain hose onto the headstock oil supply line. If necessary, use a hose clamp to ensure a tight connection.
5. Hold the other end of the drain tube in the bucket, then turn the master power switch **ON** and reset the STOP button. The oil pump will start pumping oil from the tank and into the bucket.
6. As soon as you hear a sucking sound from the tank or when the oil slows or stops flowing out, turn the master power switch **OFF** to stop the pump.

7. Remove the drain hose and re-connect the headstock oil supply line to the check valve.
8. Place rags under the tank outlet cover to catch the residual oil in the tank when the cover is removed in the next step (see **Figure 101**).

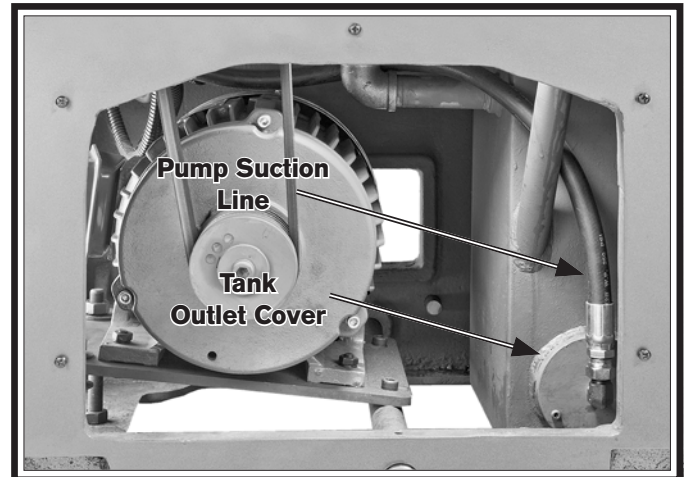


Figure 101. Location of tank outlet cover.

9. Remove the pump suction line from the tank outlet cover, remove the three cap screws that secure the cover, then carefully remove the cover.
10. Use mineral spirits and rags to clean the inside of the tank. Make sure to soak up any excess mineral spirits with dry rags so that it does not stay in the tank and contaminate the oil.

Tip: Consider placing one or two magnets at the bottom of the tank to collect any fine metal particles. This will make cleaning easier the next time around and reduce the amount of metal particles that may end up in the oil.

11. Re-install the tank outlet cover with a new gasket or silicone sealant.
12. Place the funnel in the fill spout and add the new oil.
13. Re-install the tank fill cap and end gear and tank access covers, then test the oil pump operation.

Quick-Change Gearbox

Oil Type Mobil Vactra 2 or ISO 68 Equivalent
 Oil Amount 3.2 Quarts
 Check/Add Frequency Daily
 Change Frequency Annually

Checking Oil Level

The quick-change gearbox has the proper amount of oil when the sight glass shown in **Figure 102** is halfway full.



Figure 102. Location of quick-change gearbox oil sight glass.

Adding Oil

Remove the quick-change gearbox fill plug (see **Figure 103**), then add oil until the level is approximately halfway in the gearbox oil sight glass.

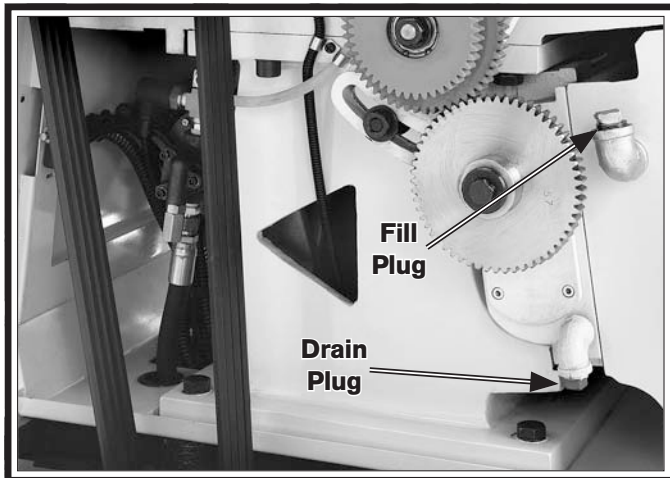


Figure 103. Locations of the quick-change gearbox fill and drain plugs.

Draining Oil

Place a catch pan under the quick-change gearbox drain plug (see **Figure 103**), loosen the fill plug and remove the drain plug, then allow the gearbox reservoir to empty.

Apron

Oil Type Mobil Vactra 2 or ISO 68 Equivalent
 Oil Amount 2.1 Quarts
 Check/Add Frequency Daily
 Change Frequency Annually

Checking Oil Level

The apron has the proper amount of oil when the sight glass shown in **Figure 104** is halfway full.

Important: Keep in mind that the apron one-shot oiler draws the oil from the apron reservoir. Check this oil level often when using the one-shot oiler.

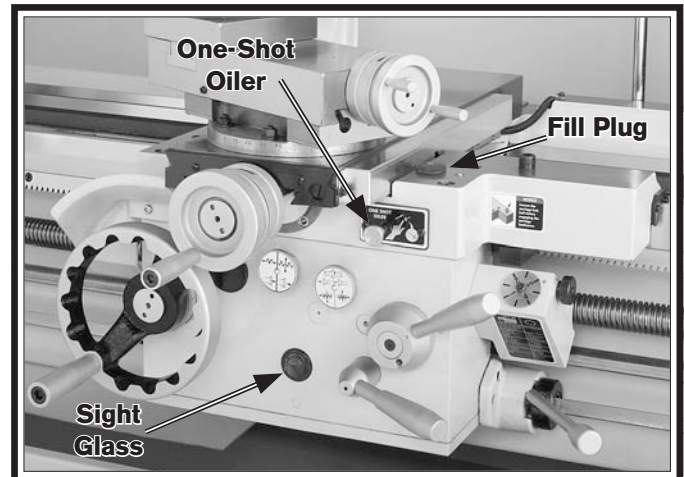


Figure 104. Location of apron oil sight glass.

Adding Oil

Remove the twist-off fill plug shown in **Figure 104**, and add oil until the sight glass is halfway full.

Draining Oil & Flushing Reservoir

Since the apron oil reservoir supplies the one-shot oiler, the oil is constantly being refreshed when the reservoir is filled. However, small metal particles may accumulate at the bottom of the reservoir with normal use. Therefore, to keep the reservoir clean, drain and flush it at least once a year.

Place a catch pan under the apron drain plug shown in **Figure 105**, loosen the fill plug, then use a 6mm hex wrench to remove the drain plug and empty the reservoir.

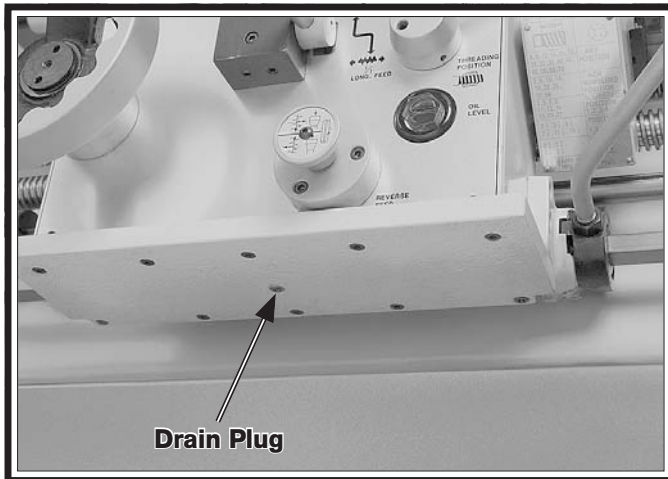


Figure 105. Location of apron drain plug.

Flush the reservoir by pouring a small amount of clean oil into the fill hole and allowing it to drain out the bottom.

Replace the drain plug and add oil as previously described.

One-Shot Oiler

The one-shot oiler shown in **Figure 106** lubricates the saddle ways with oil from the apron reservoir.

To use the one-shot oiler, pull the pump knob out for two or three seconds and then push it in. The pump draws oil from the apron reservoir and then forces it through drilled passages to the way guides.

Repeat this process while moving the carriage and cross slide through their full range of movement to distribute oil along the ways.

Lubricate the guides before and after operating the lathe. If the lathe is in a moist or dirty environment, increase the lubrication interval.

Check the apron oil level through the sight glass before using the one-shot oiler.

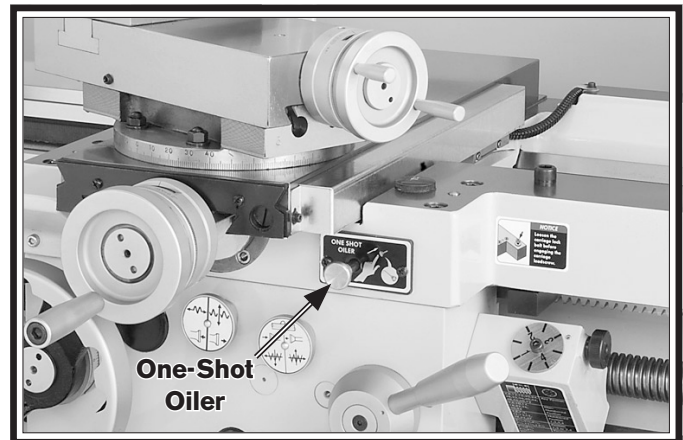


Figure 106. Location of one-shot oiler on the apron.

Longitudinal Leadscrew

Oil Type Mobil Vactra 2 or ISO 68 Equivalent
 Oil Amount As Needed
 Lubrication Frequency..... Daily

Before lubricating the leadscrew, clean it first with mineral spirits. A stiff brush works well to help clean out the threads. Make sure to move the carriage out of the way, so you can clean the entire length of the leadscrew.

Apply a thin coat of oil along the length of the leadscrew. Use a stiff brush to make sure the oil is applied evenly and down into the threads.

Note: In some environments, abrasive material can become caught in the leadscrew lubricant and drawn into the half nut. In this case, lubricate the leadscrew with a quality dry lubricant.

Ball Oilers

Oil Type Mobil Vactra 2 or ISO 68 Equivalent
 Oil Amount As required
 Pump Oil Can w/Plastic or Rubber Cone Tip 1
 Lubrication Frequency..... Before and After Use

Proper lubrication of ball oilers is done with a pump-type oil can that has a plastic or rubberized cone tip. We do not recommend using a metal needle or lance tips that can push the ball too far into the oiler, break the spring seat, and cause the ball to fall into the oil galley.

Lubricate the ball oilers before and after machine use, and more frequently under heavy use. When lubricating ball oilers, first clean the outside surface to remove any dust or grime. Push the rubber or plastic tip of the oil can nozzle against the ball oiler to create a hydraulic seal, then pump the oil can once or twice. If you see sludge and contaminants coming out of the lubrication area, keep pumping the oil can until the oil runs clear. When finished, wipe away any excess oil.

Refer to **Figures 107–109** to identify the locations of each oil device.

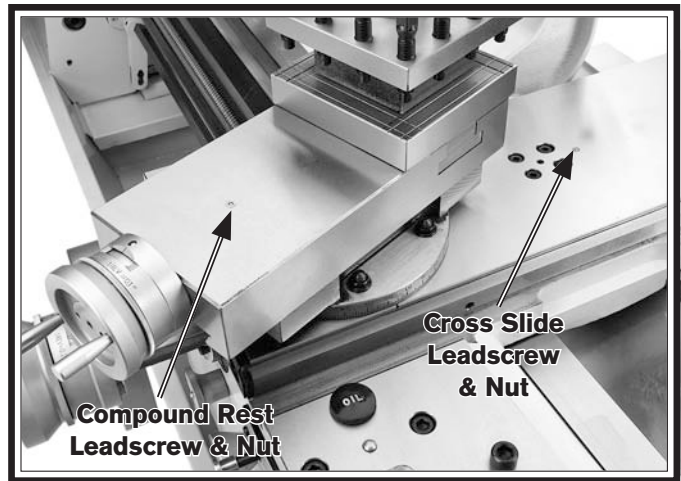


Figure 107. Carriage ball oilers.

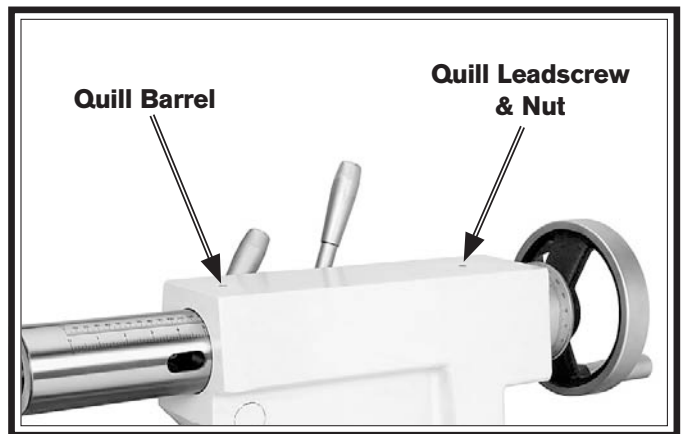


Figure 108. Tailstock ball oilers.

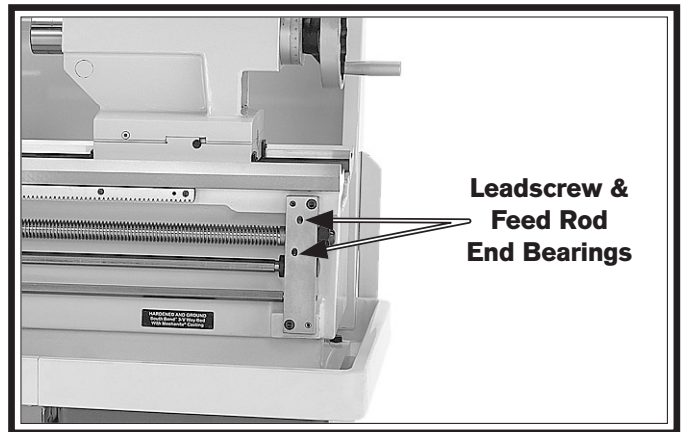


Figure 109. Leadscrew end bearing.

End Gears

Grease Type..... NLGI#2
Frequency Annually or When Changing

The end gears, shown in **Figure 110**, should always have a thin coat of heavy grease to minimize corrosion, noise, and wear. Wipe away excess grease that could be thrown onto the V-belts and reduce optimal power transmission from the motor.

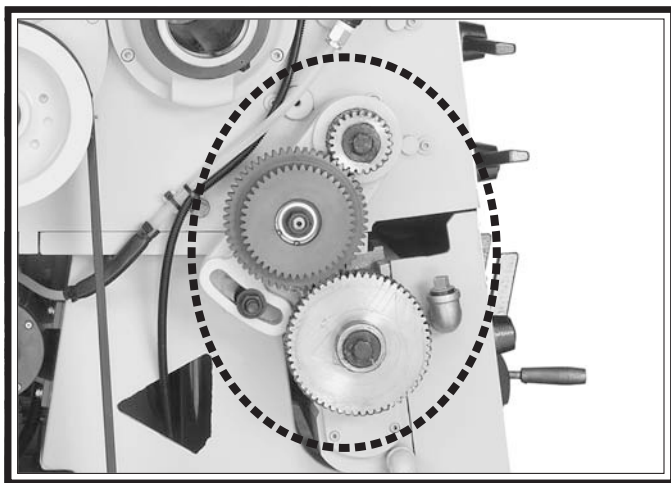


Figure 110. End gears.

Handling & Care

Make sure to clean and lubricate any gears you install or change. Be very careful during handling and storage—the grease coating on the gears will easily pickup dirt or debris, which can then spread to the other gears and increase the rate of wear.

Make sure the end gear cover remains installed whenever possible to keep the gears free of dust or debris from the outside environment.

Lubricating

1. DISCONNECT LATHE FROM POWER!
2. Remove the end gear cover and all the end gears shown in **Figure 110**.
3. Clean the end gears thoroughly with mineral spirits to remove the old grease. Use a small brush if necessary to clean between the teeth.
4. Clean the shafts, and wipe away any grease splatters in the vicinity and on the inside of the end gear cover.
5. Using a clean brush, apply a thin layer of grease on the gears. Make sure to get grease between the gear teeth, but do not fill the teeth valleys.
6. Install the end gears and mesh them together with an approximate 0.002" backlash. Once the gears are meshed together, apply a small dab of grease between them where they mesh together—this grease will be distributed when the gears rotate and re-coat any areas scraped off during installation.
7. Re-install the end gear cover before re-connecting the lathe to power.

Coolant System Service

The coolant system consists of a fluid tank, pump, and flexible nozzle. The pump pulls fluid from the tank and sends it to the valve, which controls the flow of coolant to the nozzle. As the fluid leaves the work area, it drains back into the tank through the chip drawer and catch tray where the swarf is screened out.

Use **Figures 111–112** to identify the locations of the coolant system controls and components.

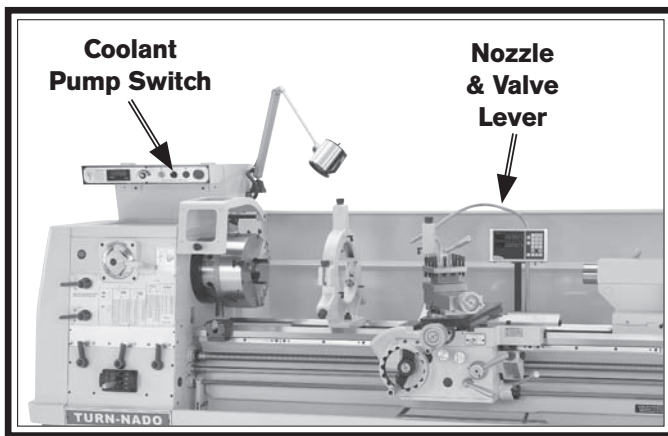


Figure 111. Coolant controls.

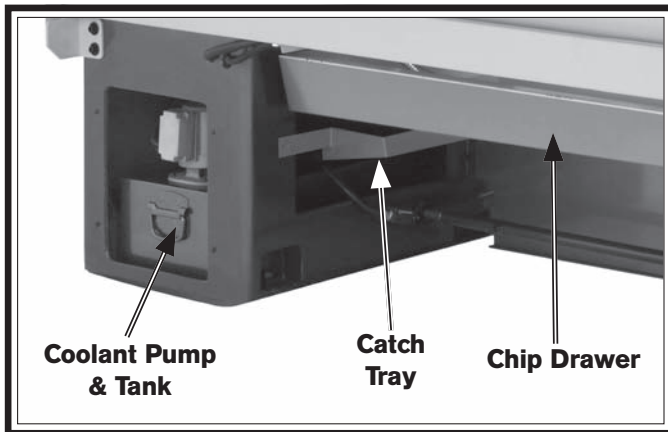


Figure 112. Additional coolant components.

Although most swarf from machining operations is screened out of the coolant before it returns to the tank, small particles will accumulate in the bottom of the tank in the form of sludge. To prevent this sludge from being pulled into the pump and damaging it, the pump’s suction tube is positioned a couple inches from the bottom of the tank and fitted with a fine screen. This works well when the tank is regularly cleaned; however, if too much sludge is allowed to accumulate before the tank is cleaned, the pump will inevitably begin sucking it up.

Hazards

As coolants ages and gets used, dangerous microbes can proliferate and create a biological hazard. The risk of exposure to this hazard can be greatly reduced by replacing the old fluid on a monthly basis, or as indicated by the fluid manufacturer.

The important thing to keep in mind when working with the coolant is to minimize exposure to your skin, eyes, and lungs by wearing the proper PPE (Personal Protective Equipment), such as splash-resistant safety goggles, long-sleeve waterproof gloves, protective clothing, and a NIOSH approved respirator.

	<p>! WARNING BIOLOGICAL & POISON HAZARD!</p>
	<p>Use the correct personal protection equipment when handling coolant. Follow federal, state, and fluid manufacturer requirements for proper disposal.</p>

Adding Fluid

1. DISCONNECT LATHE FROM POWER!
2. Remove the vented access cover from the rear of the right stand, then slide the tank out, as shown in **Figure 113**.

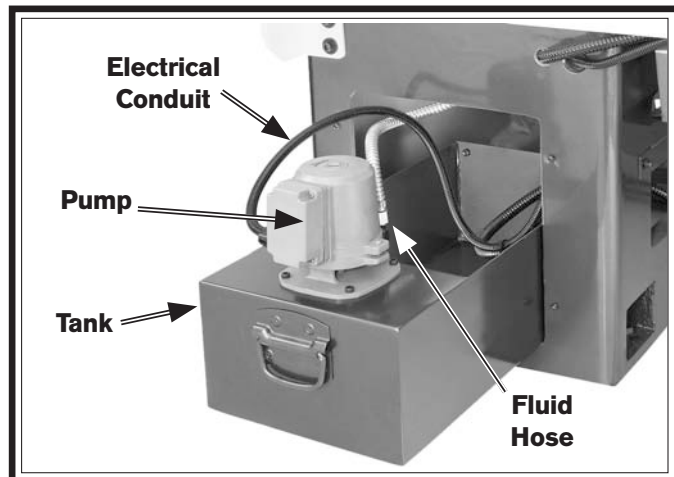


Figure 113. Coolant tank and pump.

3. Pour coolant into the tank until it is nearly full.
4. Slide the tank back into the cabinet and replace the access cover.

Changing Coolant

When you replace the old coolant, take the time to thoroughly clean out the chip drawer, catch tray, and fluid tank. The entire job only takes about a ½ hour when you are prepared with the proper materials and tools. Make sure to dispose of old fluid according to federal, state, and fluid manufacturer's requirements.

Items Needed:

	Qty
Safety Wear	See Hazards on Page 75
New Coolant	25.4 Quarts
Empty 5-Gallon Bucket w/Lid	2
Phillips Screwdriver #2	1
Wrench ¾"	1
Disposable Shop Rags	As Needed
Hose or Tubing ⅝" x 60" (Optional)	1 Piece
Magnets (Optional)	As Many As Desired

To change the coolant:

1. Position the coolant nozzle over the back of the backsplash so that it is pointing behind the lathe.
2. Place the 5-gallon bucket behind the lathe and under the coolant nozzle. If you are using the optional hose, connect it to the nozzle and place it in the bucket. Otherwise, you may need to have another person hold the bucket up to the nozzle to prevent coolant from splashing out.
3. Turn the coolant pump **ON** and pump the old fluid out of the reservoir. Turn the pump **OFF** immediately after the fluid stops flowing.

NOTICE

Running the coolant pump without adequate fluid in the tank may permanently damage it, which will not be covered under warranty.

4. DISCONNECT LATHE FROM POWER!
 5. Remove the vented access cover from the rear of the right stand, then slide the tank out.
 6. To enable the remaining fluid to be poured out in the next step, disconnect the fluid hose from the pump (see **Figure 113**).
- Note:** The electrical conduit was purposely left long, so the tank can be removed and dumped out without disconnecting the wires from the pump.
7. Pour the remaining coolant into the 5-gallon bucket and close the lid.
 8. Clean all the sludge out of the bottom of the tank and then flush it clean. Use the second bucket to hold the waste and make sure to seal the lid closed when done.

Dispose of the old coolant and swarf according to federal, state, and fluid manufacturer's requirements.

9. Slide the tank partially into the base and re-connect the fluid hose.
- Tip:** Leave one or more magnets at the bottom of the tank to collect metal chips and make cleanup easier next time. This will also help keep small metal chips out of the pump.
10. Refill the tank with new coolant, then slide it completely into the base.
11. Replace the access cover panel.
12. Re-connect the lathe to power and point the nozzle into the chip drawer.
13. Turn the master power switch **ON**, then reset the STOP button.
14. Turn the coolant pump **ON** to verify that fluid cycles properly, then turn it **OFF**.
4. Thoroughly clean all unpainted, bare metal surfaces, then apply a liberal coat of way oil, heavy grease, or rust preventative. Take care to ensure these surfaces are completely covered but that the rust preventative or grease is kept off of painted surfaces.
5. Lubricate the machine as outlined in the lubrication section. Be sure to use an oil can to purge all ball oilers and oil passages with fresh oil.
6. Loosen or remove the V-belts so they do not become stretched during the storage period. (Be sure to place a maintenance note near the power button as a reminder that the belts have been loosened or removed.)
7. Place a few moisture absorbing desiccant packs inside of the electrical box.
8. Cover the lathe and place it in a dry area that is out of direct sunlight and away from hazardous fumes, paint, solvents, or gas. Fumes and sunlight can bleach or discolor paint and make the chuck guard cloudy.
9. Every few months, rotate by hand all gear-driven components a few times in several gear selections. This will keep the bearings, bushings, gears, and shafts well lubricated and protected from corrosion—especially during the winter months.

Machine Storage

To prevent the development of rust and corrosion, the lathe must be properly prepared if it will be stored for a long period of time. Doing this will ensure the lathe remains in good condition for later use.

To prepare the lathe for storage:

1. Run the lathe and bring all gearboxes to operating temperature, then drain and refill them with clean oil.
2. Pump out the old coolant, then add a few drops of way oil and blow out the lines with compressed air.
3. **DISCONNECT LATHE FROM POWER!**

Slide the carriage, micrometer stop, tailstock, and steady rest down the lathe bed to make sure that way spotting is not beginning to occur.

Backlash Adjustment

Backlash is the amount of free play felt while changing rotation directions with the handwheel. This can be adjusted on the compound rest and cross slide leadscrews. Before beginning any adjustment, make sure that all associated components have been cleaned and lubricated.

NOTICE

Reducing backlash to less than 0.002" is impractical and can lead to accelerated wear of the wedge, nut, and leadscrew. Avoid the temptation to overtighten the backlash set screw while adjusting.

Compound Rest

Tools Needed: **Qty**
 Hex Wrench 3mm 1

The compound rest backlash is adjusted by tightening the set screws shown in **Figure 114**. When these screws are adjusted against the leadscrew nut, they offset part of the nut to remove play between the nut and leadscrew.

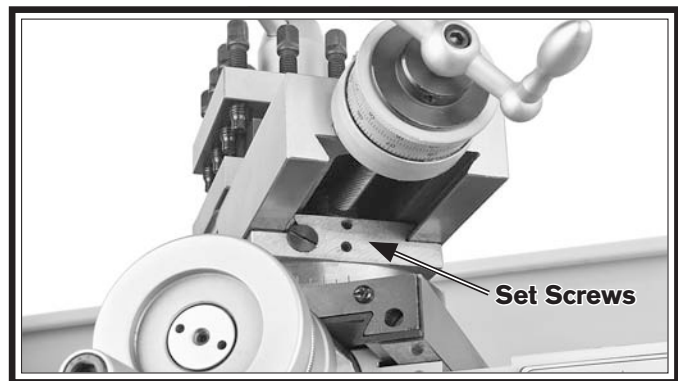


Figure 114. Compound rest backlash adjustment set screws.

To adjust the backlash, rock the handwheel back and forth, and tighten the screws slowly until the backlash is approximately 0.002"–0.003", as indicated on the graduated dial.

If you end up adjusting the nut too tight, loosen the set screws, tap the compound rest a few times with a rubber or wooden mallet, and turn the handwheel slowly back and forth until it moves freely—then try again.

Cross Slide

Tools Needed: **Qty**
 Hex Wrench 3mm 1
 Hex Wrench 5mm 1

The cross slide backlash is adjusted by loosening all four cap screws shown in **Figure 115**, then tightening the center set screw. This will push down on a wedge and force the leadscrew nut apart, taking up lash between the nut and leadscrew.

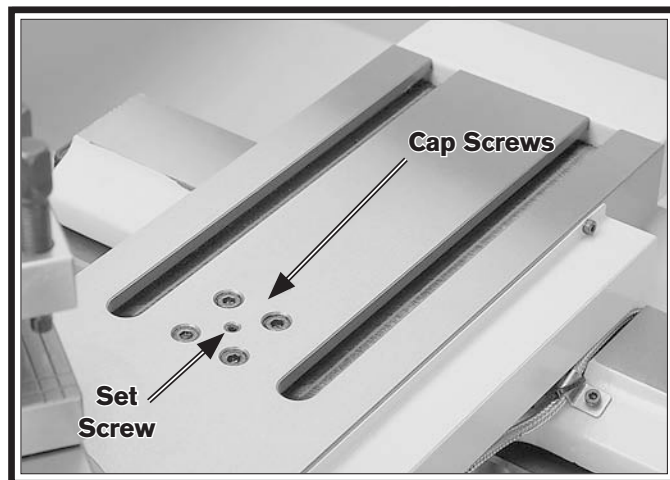


Figure 115. Cross slide backlash adjustment screws.

To adjust the backlash, remove the compound rest and loosen the four cap screws. Then, rock the cross slide handwheel back and forth, and tighten the set screw slowly until the backlash is at approximately 0.002"–0.003" as indicated on the graduated dial.

If you end up adjusting the nut too tight, loosen the set screw, tap the cross slide a few times with a rubber or wooden mallet, and turn the handwheel slowly back and forth, until the handle turns freely—then try again.

Remember to re-tighten the four cap screws when you are finished.

Leadscrew End Play Adjustment

After a long period of time, you may find that the leadscrew develops a small amount of end play. This lathe is designed so that leadscrew end play can be removed with an easy adjustment.

Tools Needed:	Qty
Open End Wrench 36mm or 1 $\frac{7}{16}$ "	1
Hex Wrench 3mm	1

To remove leadscrew end play:

1. DISCONNECT LATHE FROM POWER!
2. Loosen both retaining nut set screws (see Figure 116).

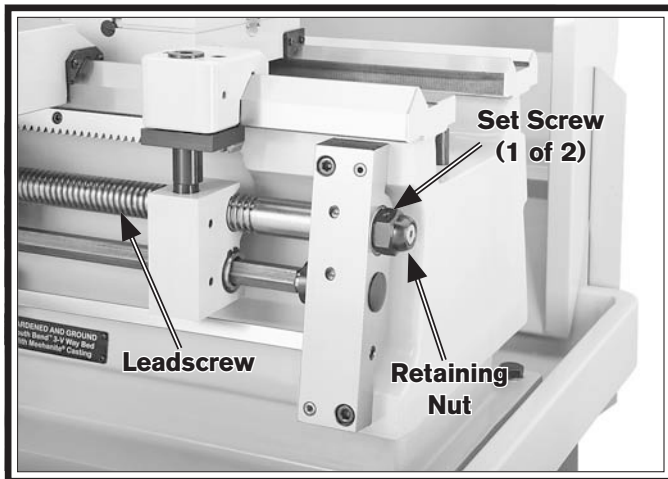


Figure 116. Leadscrew end play adjustment.

4. Engage the half nut lever.
5. Rotate the carriage handwheel back slightly and tighten the retaining nut at the same time until the end play is removed.
6. Tighten both set screws to secure the setting.

Gib Adjustment

The goal of adjusting the gib screws is to remove sloppiness or "play" from the ways without over-adjusting them to the point where they become stiff and difficult to move.

In general, loose gibs cause poor finishes and tool chatter; however, over-tightened gibs cause premature wear and make it difficult to turn the handwheels.

Important: Before adjusting the gibs, loosen the locks for the device so that the gibs can freely slide during adjustment, then lubricate the ways.

The gibs are tapered and held in position by a screw at each end. To adjust the gib, turn one screw $\frac{1}{4}$ turn clockwise and the other screw $\frac{1}{4}$ turn counterclockwise, so both screws move in the same direction and the same amount. Test the feel of the sliding component by turning the handwheel, and adjust the gib screws as necessary to make it tighter or looser.

The gib adjustment process usually requires some trial-and-error. Repeat the adjustment process as necessary until you find the best balance between loose and stiff movement. Most machinists find that the ideal gib adjustment is one where a small amount of drag or resistance is present, yet the handwheels are still easy to move.

Figures 117–121 show the location of the adjustment screws for each gib on this machine.

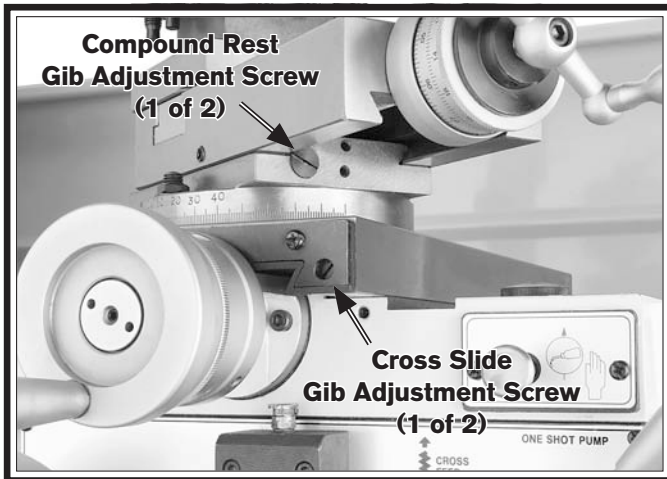


Figure 117. Compound and cross slide gib adjustment screws.

Note: Remove the thread dial body and the carriage lock clamp to access the saddle gib adjustment screw on the tailstock side (see Figure 120).

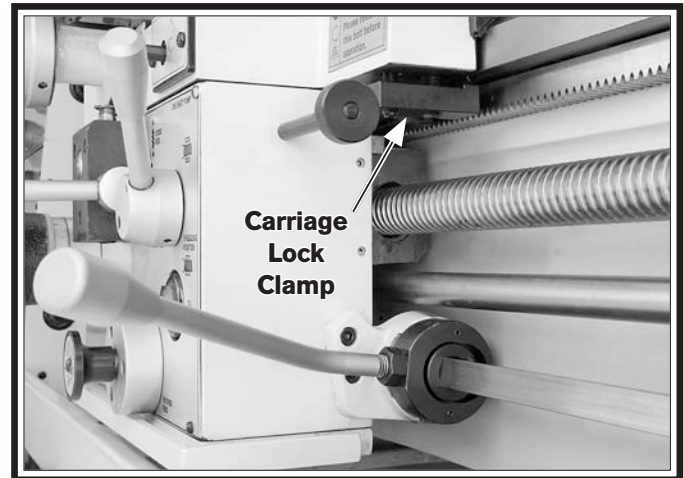


Figure 120. Carriage lock clamp.

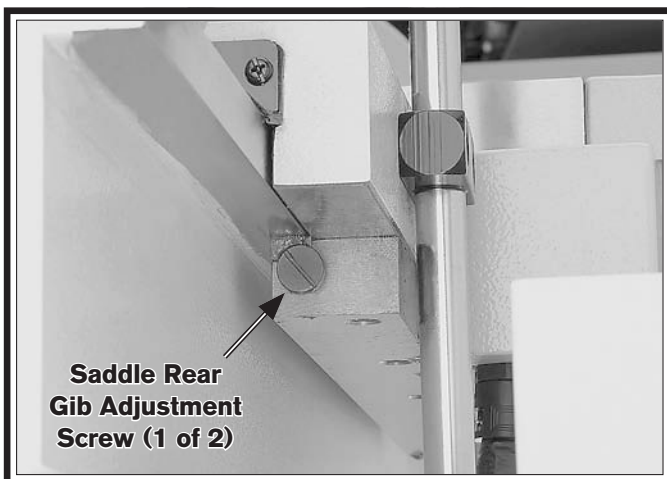


Figure 118. One of two rear saddle gib adjustment screws.

Note: Before adjusting the tailstock gib, loosen the clamping hex bolts underneath both ends of the tailstock (see Figure 121) to release the clamping pressure between the upper and lower castings. Test the gib adjustment by using the offset adjustment screws. When you are satisfied with the setting, retighten the clamping hex bolts.

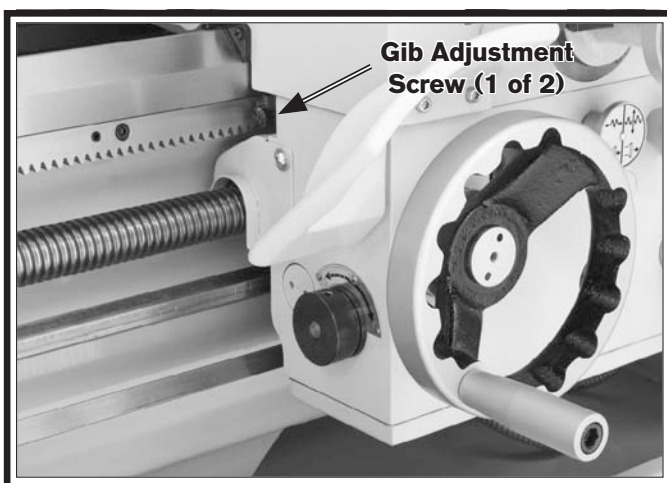


Figure 119. Front saddle gib adjustment screw.

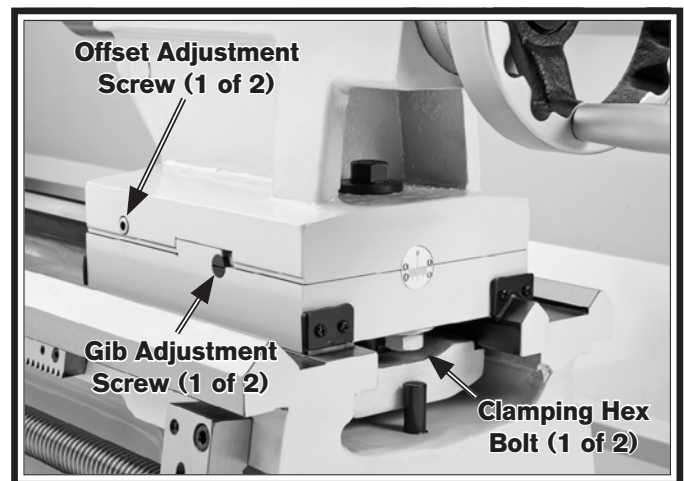


Figure 121. Tailstock gib adjustment controls.

Half Nut Adjustment

The clamping pressure of the half nut is fully adjustable with a gib that can be loosened or tightened by two set screws. Use this procedure to adjust the half nut if it becomes loose from wear, or it is too tight for your preferences. A half nut that is too loose will make it difficult to produce accurate work. A half nut that is too tight will increase the rate of wear on itself and the leadscrew.

Tool Needed:	Qty
Hex Wrench 3mm	1

To adjust the half nut:

1. Disengage the half nut, then remove the thread dial.
2. Turn the two set screws (see **Figure 122**) clockwise to tighten the half nut and counterclockwise to loosen it.

Make sure to turn the set screws in even amounts so that one end of the gib does not become tighter than the other.

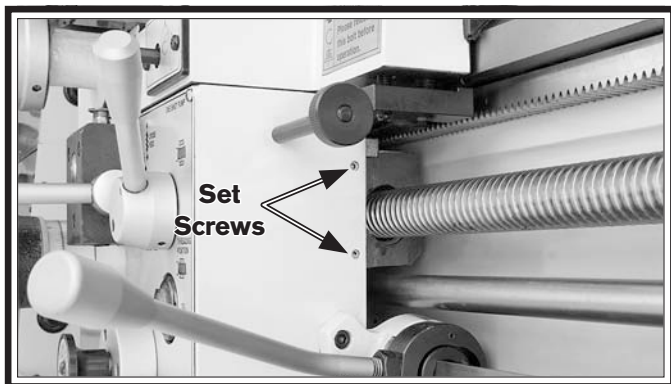


Figure 122. Half nut gib adjustment.

3. Engage/disengage the half nut several times and notice how it feels. The half nut is correctly adjusted when it has a slight drag while opening and closing. The movement should not be too stiff or too sloppy.
4. Repeat **Steps 2-3**, if necessary, until you are satisfied with the half nut pressure.
5. Re-install the thread dial.

V-Belts

V-belts stretch and wear with use, so check the tension on a monthly basis to ensure optimal power transmission. Replace all of the V-belts as a matched set if any of them show signs of glazing, fraying, or cracking.

Tools Needed:	Qty
Phillips Screwdriver #2	1
Open End Wrench 24mm.....	1

To adjust the V-belts:

1. DISCONNECT LATHE FROM POWER!
2. Remove the motor access covers shown in **Figure 123**.

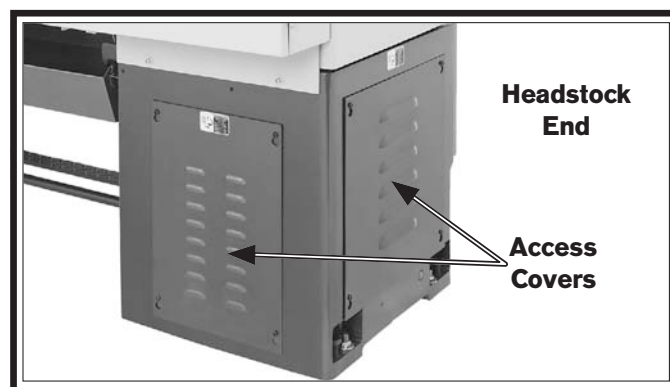


Figure 123. Locations of motor access covers.

3. Adjust the hex nuts on the motor mount bolts shown in **Figure 124** to move the motor mount plate up or down and adjust the V-belt tension. When correctly tensioned, each belt should have about 3/4" deflection when pressed firmly (see **Figure 124**).

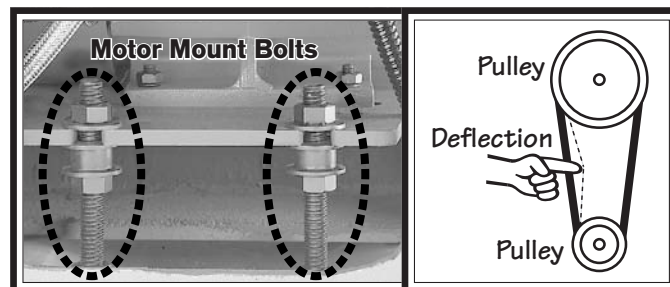


Figure 124. V-belt adjustment.

4. Tighten the hex nuts against both sides of the motor mount plate to prevent it from moving out of adjustment during operation, then re-install the access covers.

Brake Service

The brake linkage on this lathe is not adjustable. As pivot points wear, the increased play in the linkage absorbs the usable stroke that is required for full brake application.

If the brake does not stop the lathe quickly, verify that the linkage is not excessively worn or damaged and that all fasteners are tight before replacing the brake shoes.

Needed:	Qty
Another Person	1
Hex Wrench 6mm	1
Hex Wrench 8mm	1
Needle-Nose Pliers	1
Basic Calipers	1
Safety Goggles	1 for Each Person
Approved Respirator	1 for Each Person

To replace the brake shoes:

1. DISCONNECT LATHE FROM POWER!
2. Put on a respirator and eye protection to protect yourself from hazardous brake dust.
3. With the help of another person, remove the splash guard. See **Figure 125** for the locations of the cap screws that secure the backslash.

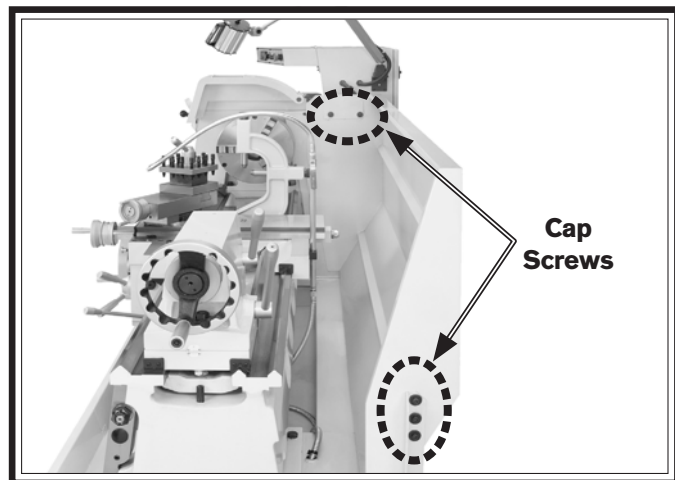


Figure 125. Locations of the backslash cap screws.

4. Remove the two cap screws that secure the chuck guard to the top of the headstock (see **Figure 126**), then remove the guard.

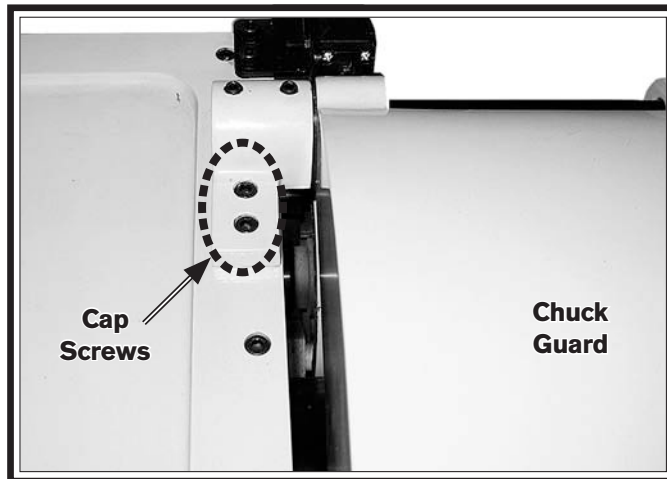


Figure 126. Location of cap screws securing the chuck guard.

5. If installed, remove the chuck from the spindle, then remove the brake drum cover (see **Figure 127**).

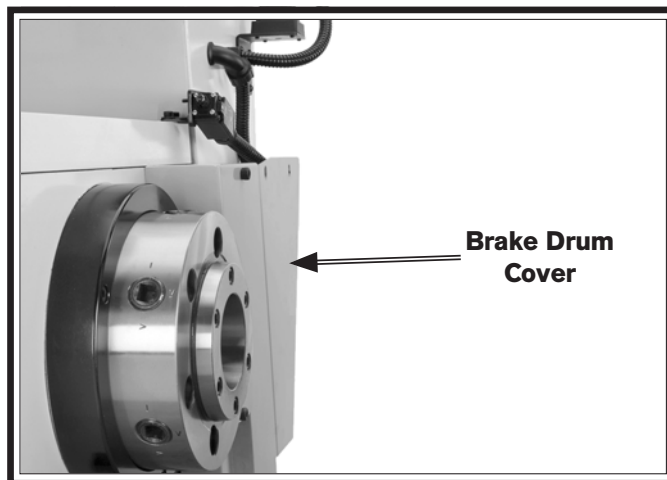


Figure 127. Brake drum cover.

6. Have another person step on the brake pedal while you verify that the cam lobe shown in **Figure 128** makes the brake switch plunger click in.

— If the switch does not click, loosen the two switch mounting screws, push the pedal all the way down, and move the switch closer to the lobe until it clicks. Secure the switch in place at this location.

With the foot pedal released, the switch plunger should be approximately 3mm from the lobe.

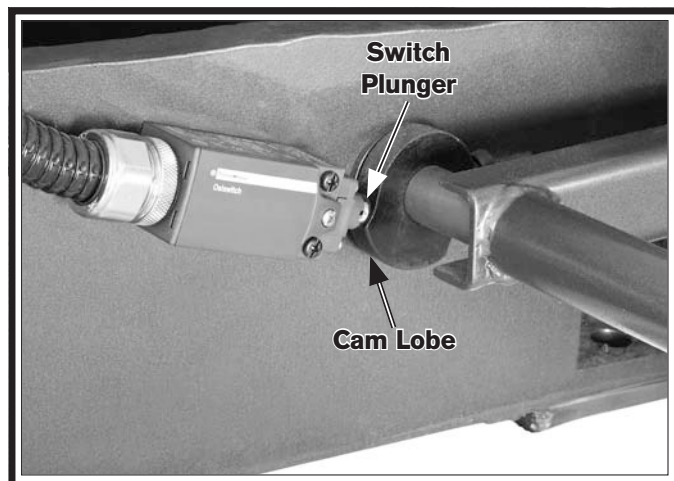


Figure 128. Brake switch.

7. Have another person press and release the brake pedal a few times while you watch for loose linkage fasteners or worn pivot points. Tighten or replace parts as necessary.
8. While the brake pedal is being held down to lock the brake drum in place, remove the drum retaining cap screw and flat washer shown in **Figure 129**.
9. Use mineral spirits and a rag to clean the drum, then inspect it.
- If the drum is bell-mouthed, cracked, or shows deep grooves, replace it. For minor scoring, the drum can be dressed with sandpaper or turned on a lathe.

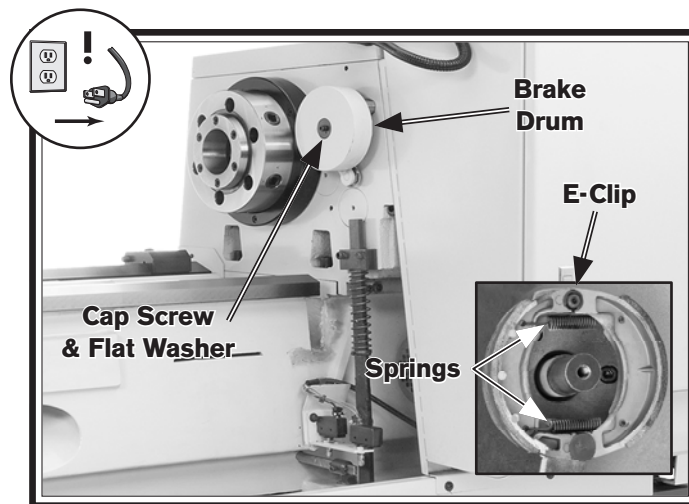


Figure 129. Brake drum.

10. Remove the E-clip and springs shown in the inset of **Figure 129**, then remove the brake shoes.
11. Clean the brake shoes with hot soapy water, then inspect them and measure the brake lining thickness.
- If the lining is $\frac{3}{16}$ " or less or if the lining is damaged, replace the brake shoes as a set.
12. Replace the brake drum cover, backsplash, and chuck guard before re-connecting the lathe to power.

Leadscrew Shear Pin Replacement

The leadscrew is secured to a connecting collar that is part of the headstock drivetrain with the use of a soft-metal shear pin. The shear pin is designed to break and disengage the power transfer to the leadscrew to help protect more expensive lathe components in the case of a carriage crash or the lathe is overloaded.

Contact South Bend to order a replacement shear pin (Part Number PSB1042PF0927) or use the specifications in **Figure 130** to fabricate your own.

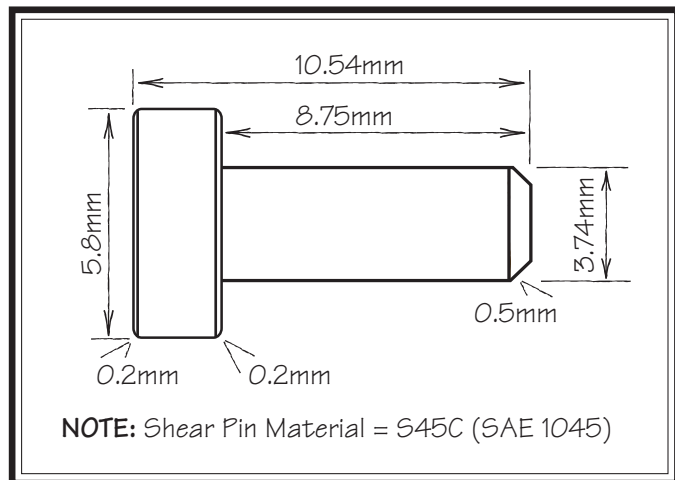


Figure 130. Shear pin specifications.

Tools Needed:

	Qty
External Retaining Ring Pliers #1	1
Magnet	1
Safety Goggles	1
Blow Gun w/Compressed Air	1
Light Machine Oil	As needed

To replace the shear pin:

1. DISCONNECT LATHE FROM POWER!
2. Clean debris and grime from the shear pin area (see **Figure 131**).



Figure 131. Location of shear pin.

3. Rotate the shroud washer on the leadscrew (see **Figure 132**) so that the cutout lines up with the shear pin head.

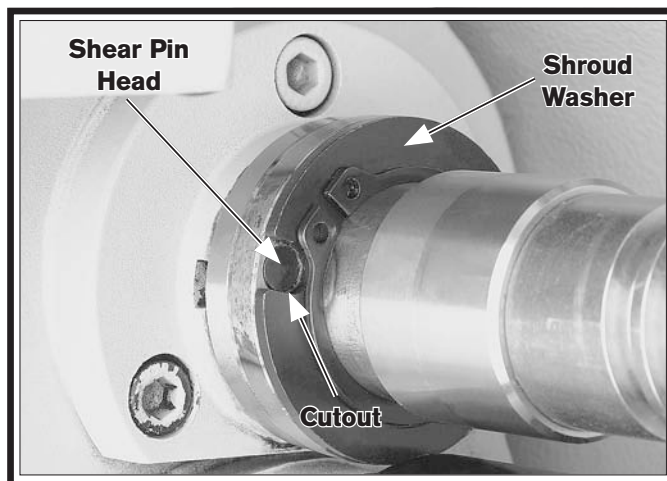


Figure 132. Shroud washer and shear pin alignment.

4. Put on safety glasses.

NOTICE

If you fabricate your own shear pin, make sure to use the material and dimensions specified in **Figure 130**. Otherwise, the shear pin may not provide the intended protection and lathe damage could result.

5. Move the retaining ring shown in **Figure 133** away from the shroud washer, then move the shroud washer away from the shear pin and against the retaining ring. This will create room for you to remove the shear pin.

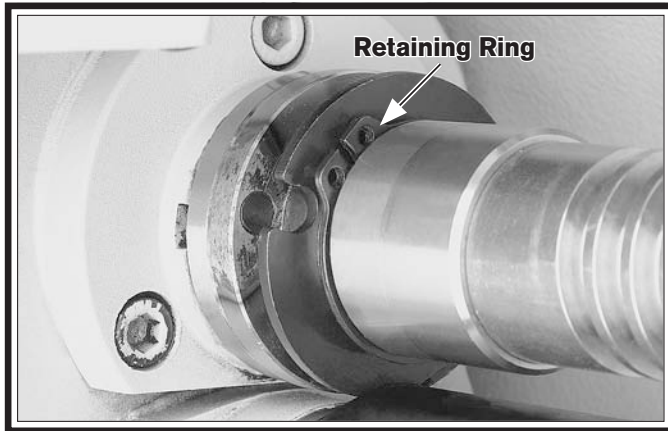


Figure 133. Shear pin access.

6. Use the magnet to remove the shear pin head.
7. Rotate the lathe spindle to line up the inner and outer bores, as shown in **Figure 134**, and use the magnet to remove the other half of the broken shear pin.

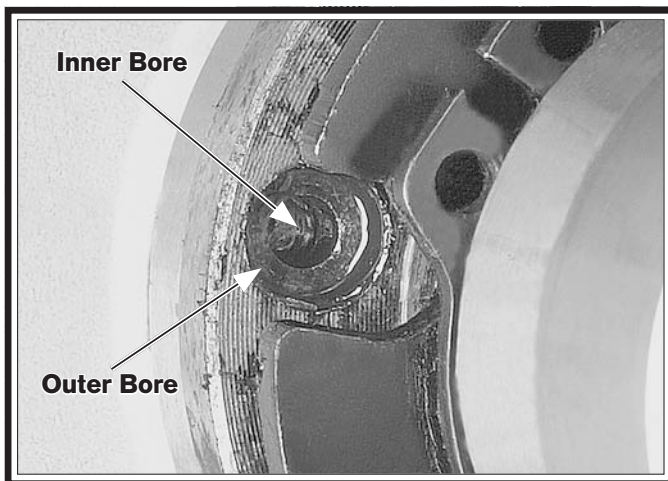


Figure 134. Shear pin bores aligned.

8. Put on safety goggles, insert the blow gun tip into the shear pin hole and blow out the hole with compressed air.
9. Put a drop of oil in the hole, then insert the new shear pin into the bore, as shown in **Figure 135**.

Note: If the pin does not freely slide into the bore, DO NOT use a hammer on the pin or you may permanently damage the shear mechanism and bore, which would make it nearly impossible to remove if it breaks again. Instead, take the time to carefully line up the two bores so it slides in easily. Chamfer the end of the pin if necessary to make it easier to insert.

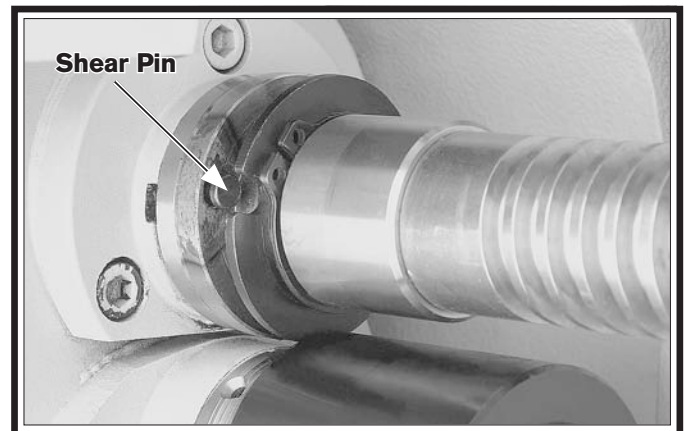


Figure 135. New shear pin installed in bore.

10. With the pin completely seated in the bore and the head flush with the leadscrew shoulder, slide the shroud washer against the shoulder, then rotate the washer 180° to completely cover the head of the shear pin, as shown in **Figure 136**.



Figure 136. Shroud washer positioning.

11. Return the retaining ring against the shroud washer and position the retaining ring ears over the shear pin head, as shown in **Figure 137**. This will prevent the shear pin from falling out if the shroud washer should rotate during operation.

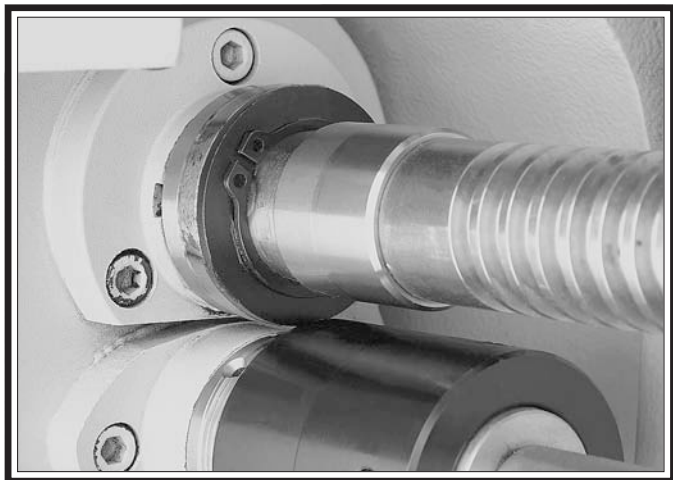


Figure 137. Retaining ring positioned with ears in front of pin access groove.

Gap Insert Removal & Installation

The gap insert directly under the spindle (see **Figure 138**) can be removed to create additional space for turning large diameter parts.

The gap insert was installed, then ground flush with the bed at the factory to ensure a precision fit and alignment. Therefore, if the gap insert is removed, it may be difficult to re-install with the same degree of accuracy.

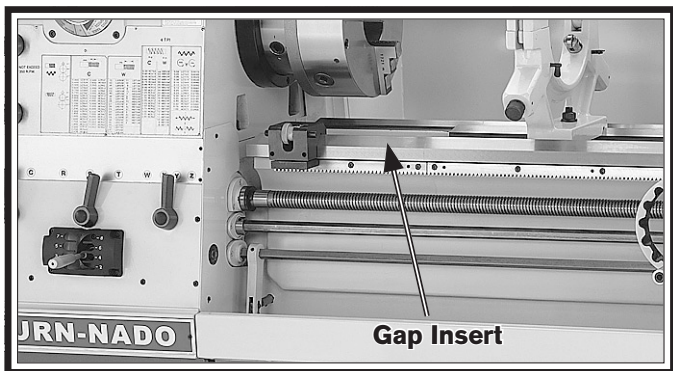


Figure 138. Gap insert.

Tools Needed:

	Qty
Hex Wrenches 6mm	1
Hex Wrench 8mm	1
Wrench 17mm	1
Dead Blow Hammer	1

Gap Removal

1. Remove the four gap-bed cap screws, shown in **Figure 139**.

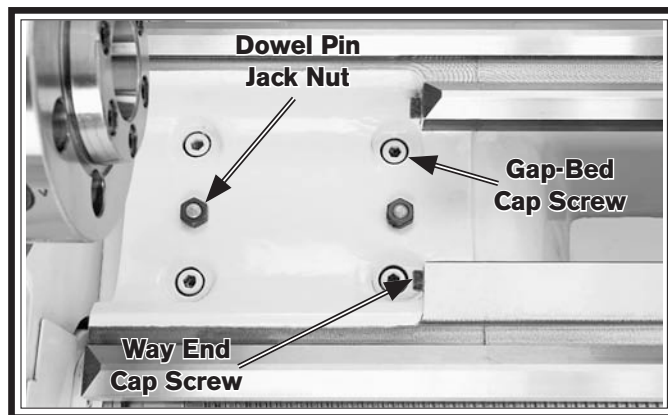


Figure 139. Fasteners holding gap in place.

2. Remove the two way-end cap screws.
3. Tighten the two dowel-pin jack nuts until the pins are pulled free from the gap insert.
4. Tap the outside of the gap insert with a dead blow hammer to loosen it, then remove it.

Gap Installation

1. Use mineral spirits and a clean lint-free rag to clean the mating surfaces of the gap, bed, and ways. If necessary, stone the mating surfaces to remove scratches, dings, or burrs.
2. Wipe a thin layer of light machine oil on the mating surfaces.
3. Place the gap insert into the gap and use a dead-blow hammer to align the insert with the lathe bed.
4. Back off the dowel pin jack nuts, and lightly tap the dowel pins back into their respective holes until they are seated. This process will further help align the gap insert and bed mating surfaces.
5. Install all fasteners and lightly snug them in place.
6. Mount a dial indicator with a magnetic base to the top of the saddle to indicate alignment.
7. First test the peak of the two prisms of the gap insert that the saddle rides on, then test the flanks of the prisms.
8. Tighten the gap bed cap screws in an alternating manner and tap the side of the gap insert into alignment.
9. Inspect the gap alignment 24 hours later to make sure the gap is still aligned. If necessary, loosen the gap bed cap screws and repeat **Steps 7-8** until the insert is properly aligned.

If you need replacement parts, or if you are unsure how to do any of the solutions given here, feel free to call us at (360) 734-1540.

Symptom	Possible Cause	Possible Solution
Machine does not start or a circuit breaker trips.	<ol style="list-style-type: none"> (First time operation only) Lathe is wired out of phase. STOP button is engaged or at fault. Spindle switch(es) are at fault. Power supply is switched OFF at master power switch or breaker. Wall fuse/circuit breaker is blown/tripped; short in electrical system; start-up load too high for circuit. Fuse has blown in machine electrical box. One or more safety switches or brake switch are engaged. Thermal overload relay has tripped. Motor connection wired incorrectly. Safety/brake switch(es) at fault. Contactors not getting energized/has burned contacts. Wiring is open/has high resistance. Motor is at fault. 	<ol style="list-style-type: none"> Correct out-of-phase wiring (refer to Page 92 for details). Rotate button clockwise until it pops out to reset it for operation; replace if not working properly. Replace bad switch(es). Make sure master power switch and circuit breaker are turned ON. Verify circuit is rated for machine amp load; troubleshoot and repair cause of overload; replace weak breaker; find/repair electrical short. Replace fuse; determine if overload is due to heavy operation; ensure power source has high enough voltage and power cord is correctly sized. Verify electrical box door, chuck guard, spindle, and brake switches are not engaged. Turn the thermal relay cut-out dial to increase working amps and push the reset pin. Replace if tripped multiple times (weak relay). Correct motor wiring connections. Test all switches and replace as necessary. Test for power on all legs and contactor operation. Replace unit if faulty. Check for broken wires or disconnected/corroded connections, and repair/replace as necessary. Test/repair/replace.
Loud, repetitious noise coming from lathe at or near the motor.	<ol style="list-style-type: none"> Pulley set screws or keys are missing or loose. Motor fan is hitting the cover. 	<ol style="list-style-type: none"> Inspect keys and set screws. Replace or tighten if necessary. Tighten fan, shim cover, or replace items.
Motor overheats.	<ol style="list-style-type: none"> Motor overloaded. 	<ol style="list-style-type: none"> Reduce load on motor.
Motor is loud when cutting, or bogs down under load.	<ol style="list-style-type: none"> Excessive depth of cut or feed rate. Spindle speed or feed rate wrong for cutting operation. Cutting tool is dull. 	<ol style="list-style-type: none"> Decrease depth of cut or feed rate. Refer to the feeds and speeds charts in Machinery's Handbook or a speeds and feeds calculator on the internet. Sharpen or replace the cutting tool.

Symptom	Possible Cause	Possible Solution
Entire machine vibrates upon startup and while running.	<ol style="list-style-type: none"> 1. Workpiece is unbalanced. 2. Loose or damaged V-belt(s). 3. V-belt pulleys are not properly aligned. 4. Worn or broken gear present. 5. Chuck or faceplate is unbalanced. 6. Gears not aligned in headstock or no backlash. 7. Broken gear or bad bearing. 8. Workpiece is hitting stationary object. 9. Spindle bearings at fault. 	<ol style="list-style-type: none"> 1. Re-install workpiece as centered with the spindle bore as possible. 2. Re-tension/replace the V-belt(s) as necessary (see Page 81). 3. Align the V-belt pulleys. 4. Inspect gears and replace if necessary. 5. Re-balance chuck or faceplate; contact a local machine shop for help. 6. Adjust gears and establish backlash. 7. Replace broken gear or bearing. 8. Stop lathe immediately and correct interference problem. 9. Reset spindle bearing preload or replace worn spindle bearings.
Bad surface finish.	<ol style="list-style-type: none"> 1. Wrong spindle speed or feed rate. 2. Dull tooling or poor tool selection. 3. Tool height not at centerline. 4. Too much play in gibs. 	<ol style="list-style-type: none"> 1. Adjust for appropriate spindle speed and feed rate. 2. Sharpen tooling or select a better tool for the intended operation. 3. Adjust tool height to centerline (see Page 51). 4. Tighten gibs (see Page 79).
Tapered tool difficult to remove from tailstock quill.	<ol style="list-style-type: none"> 1. Quill is not retracted all the way back into the tailstock. 2. Contaminants not removed from taper before inserting into quill. 	<ol style="list-style-type: none"> 1. Turn the tailstock handwheel until it forces the tapered tool out of quill. 2. Clean the taper and bore and re-install tapered tool.
Cross slide, compound, or carriage feed has sloppy operation.	<ol style="list-style-type: none"> 1. Gibs are out of adjustment. 2. Handwheel is loose or backlash is high. 3. Leadscrew mechanism worn or out of adjustment. 	<ol style="list-style-type: none"> 1. Adjust gib screw(s) (see Page 79). 2. Tighten handwheel fasteners, adjust handwheel backlash to a minimum (see Page 78). 3. Adjust leadscrew to remove end play (see Page 79).
Cross slide, compound, or carriage feed handwheel is hard to move.	<ol style="list-style-type: none"> 1. Dovetail slides loaded with shavings, dust, or grime. 2. Gib screws are too tight. 3. Backlash setting too tight (cross slide only). 4. Bedways are dry. 	<ol style="list-style-type: none"> 1. Remove gibs, clean ways/dovetails, lubricate, and re-adjust gibs. 2. Loosen gib screw(s) slightly, and lubricate bedways (see Page 79). 3. Slightly loosen backlash setting (see Page 79). 4. Lubricate bedways and handles.
Cutting tool or machine components vibrate excessively during cutting.	<ol style="list-style-type: none"> 1. Tool holder not tight enough. 2. Cutting tool sticks too far out of tool holder; lack of support. 3. Gibs are out of adjustment. 4. Dull cutting tool. 5. Incorrect spindle speed or feed rate. 	<ol style="list-style-type: none"> 1. Check for debris, clean, and retighten. 2. Re-install cutting tool so no more than $\frac{1}{3}$ of the total length is sticking out of tool holder. 3. Adjust gib screws at affected component (see Page 79). 4. Replace or resharpen cutting tool. 5. Use the recommended spindle speed.

Symptom	Possible Cause	Possible Solution
Workpiece is tapered.	<ol style="list-style-type: none"> 1. Headstock and tailstock are not properly aligned with each other. 	<ol style="list-style-type: none"> 1. Realign the tailstock to the headstock spindle bore centerline (see Page 45).
Chuck jaws will not move or do not move easily.	<ol style="list-style-type: none"> 1. Chips lodged in the jaws or scroll plate. 	<ol style="list-style-type: none"> 1. Remove jaws, clean and lubricate scroll plate, then replace jaws.
Carriage will not feed, or is hard to move.	<ol style="list-style-type: none"> 1. Gears are not all engaged. 2. Loose screw on the feed handle. 3. Carriage lock is tightened down. 4. Chips have loaded up on bedways. 5. Bedways are dry and in need of lubrication. 6. Micrometer stop is interfering. 7. Gibs are too tight. 8. Gears or shear pin broken. 	<ol style="list-style-type: none"> 1. Adjust gear levers. 2. Tighten. 3. Check to make sure the carriage lock bolt is fully released. 4. Frequently clean away chips that load up during turning operations. 5. Lubricate bedways and handles. 6. Check micrometer stop position, and adjust it as necessary (see Page 52). 7. Loosen gib screw(s) slightly (see Page 79). 8. Replace gears or shear pin (see Page 84).
Gear change levers will not shift into position.	<ol style="list-style-type: none"> 1. Gears not aligned inside headstock. 	<ol style="list-style-type: none"> 1. Rotate spindle by hand with light pressure on the lever until gear falls into place.

Electrical Safety Instructions

These pages are accurate at the time of printing. In the constant effort to improve, however, we may make changes to the electrical systems of future machines. Study this section carefully. If you see differences between your machine and what is shown in this section, call Technical Support at (360) 734-1540 for assistance BEFORE making any changes to the wiring on your machine.

Shock Hazard: It is extremely dangerous to perform electrical or wiring tasks while the machine is connected to the power source. Touching electrified parts will result in personal injury including but not limited to severe burns, electrocution, or death. For your own safety, disconnect machine from the power source before servicing electrical components or performing any wiring tasks!

Wire Connections: All connections must be tight to prevent wires from loosening during machine operation. Double-check all wires disconnected or connected during any wiring task to ensure tight connections.

Modifications: Using aftermarket parts or modifying the wiring beyond what is shown in the diagram may lead to unpredictable results, including serious injury or fire.

Motor Wiring: The motor wiring shown in these diagrams is current at the time of printing, but it may not match your machine. Always use the wiring diagram inside the motor junction box.

Circuit Requirements: Connecting the machine to an improperly sized circuit will greatly increase the risk of fire. To minimize this risk, only connect the machine to a power circuit that meets the minimum requirements given in this manual.

Capacitors/Inverters: Some capacitors and power inverters store an electrical charge for up to 10 minutes after being disconnected from the power source. To reduce the risk of being shocked, wait at least this long before working on capacitors.

Wire/Component Damage: Damaged wires or components increase the risk of serious personal injury, fire, or machine damage. If you notice that any wires or components are damaged while performing a wiring task, replace those wires or components before completing the task.

Experiencing Difficulties: If you are experiencing difficulties understanding the information included in this section, contact our Technical Support at (360) 734-1540.

WIRING DIAGRAM COLOR KEY

BLACK — Bk	BLUE WHITE — Bw	RED — Rd	PINK — Pk	WHITE — Wt
BLUE — Bl	GREEN — Gn	LIGHT BLUE — Lb	PURPLE — Pu	YELLOW GREEN — Yg
BROWN — Br	GRAY — Gy	ORANGE — Or	TUR-QUIOSE — Tu	YELLOW — Yl

NOTICE: The photos and diagrams included in this section are best viewed in color. You can see them in color at www.southbendlathe.com.

Correcting Phase Polarity

This sub-section is only provided for troubleshooting. If you discover during the test run that the lathe will not operate, or that the spindle runs backwards, the lathe may be wired out of phase.

Without the proper test equipment to determine the phase of power source legs, wiring machinery to 3-phase power may require trial-and-error. Correcting this is simply a matter of reversing the positions where two of the incoming power source wires are connected.

To correct wiring that is out of phase:

1. Push the STOP button, turn the master power switch to OFF, and disconnect the machine from power.
2. Open the electrical box and swap any two hot wires coming from the power supply, as illustrated in **Figure 140**.
3. Close and latch the electrical box, and reconnect the machine to the power source.

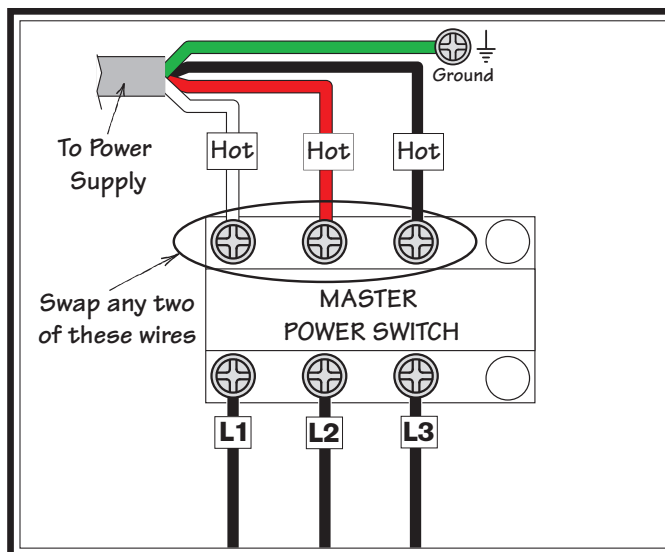
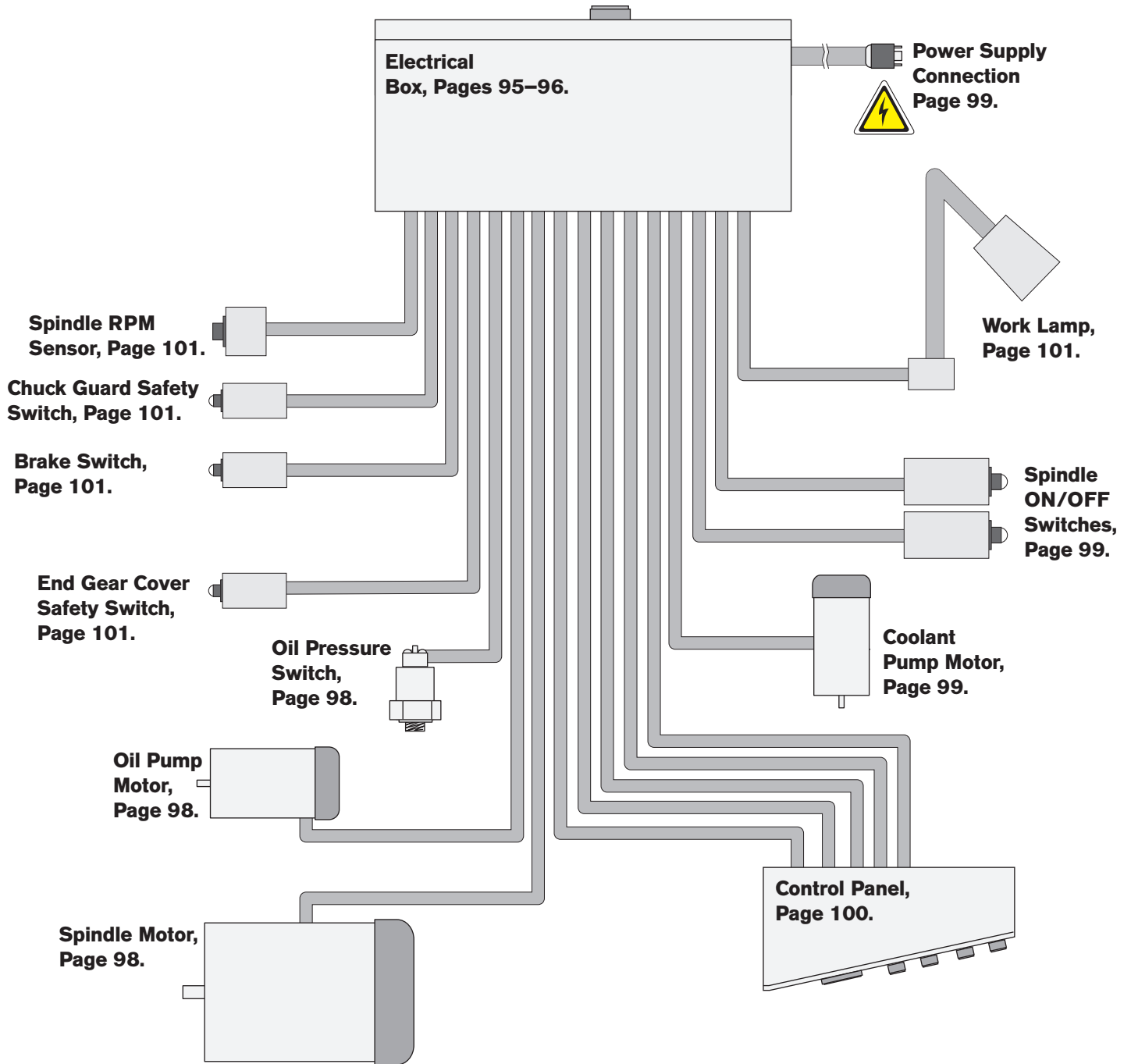


Figure 140. Swapping L1 and L2 power connections to correct out-of-phase wiring.

Wiring Overview



Component Location Index

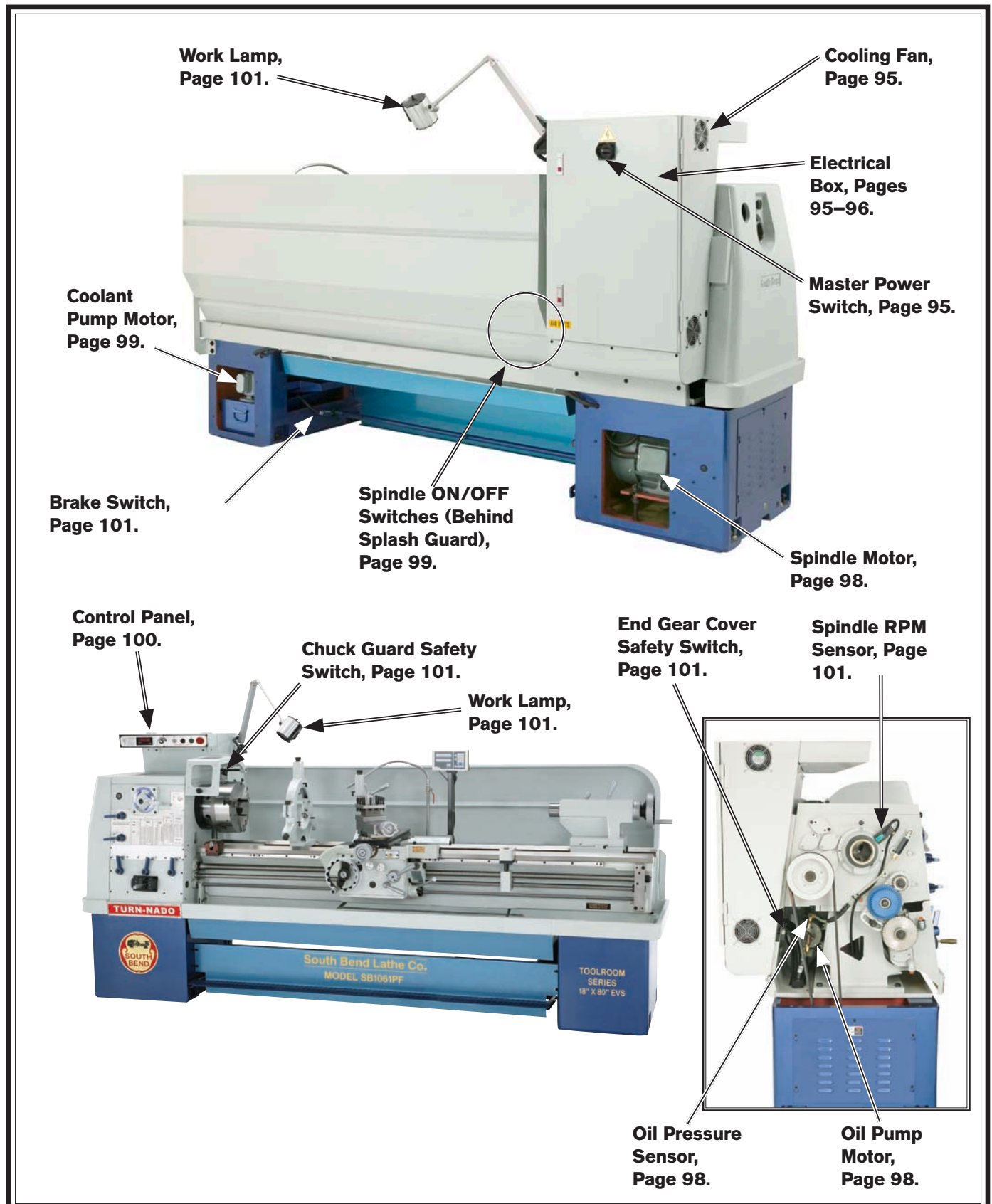


Figure 141. Component location index.

Electrical Box

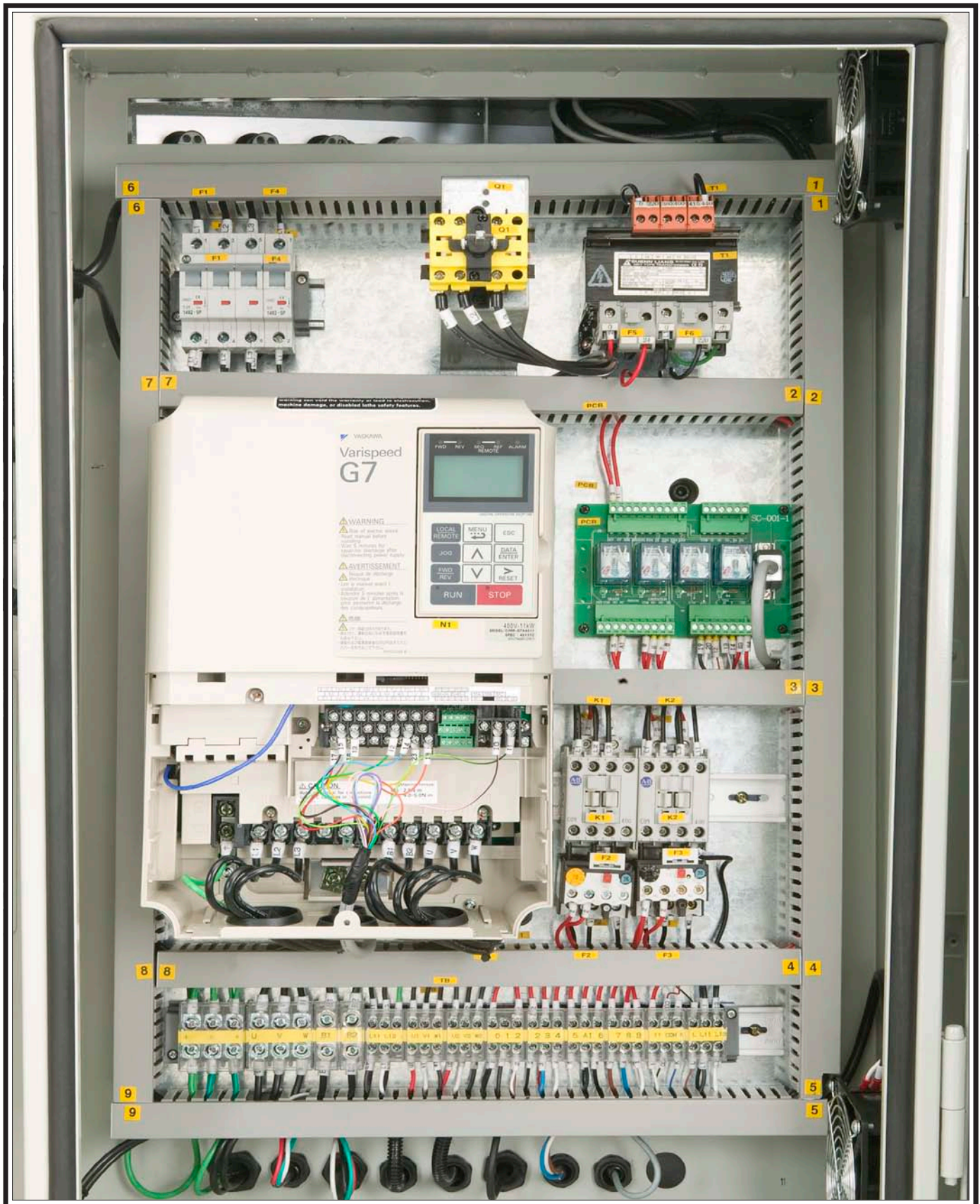


Figure 142. Electrical box.

Spindle Motor

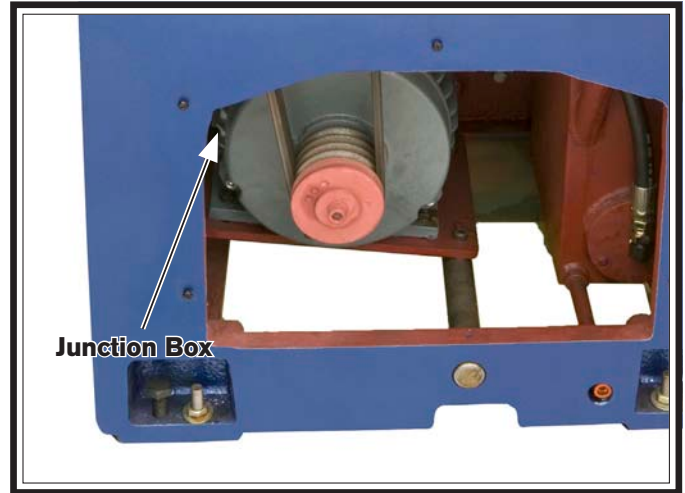
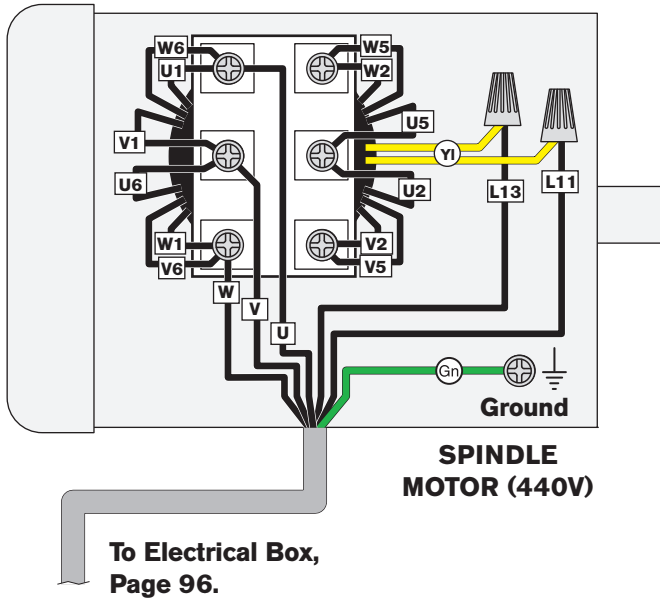


Figure 143. Spindle motor location.

Oil Pump Motor & Pressure Sensor

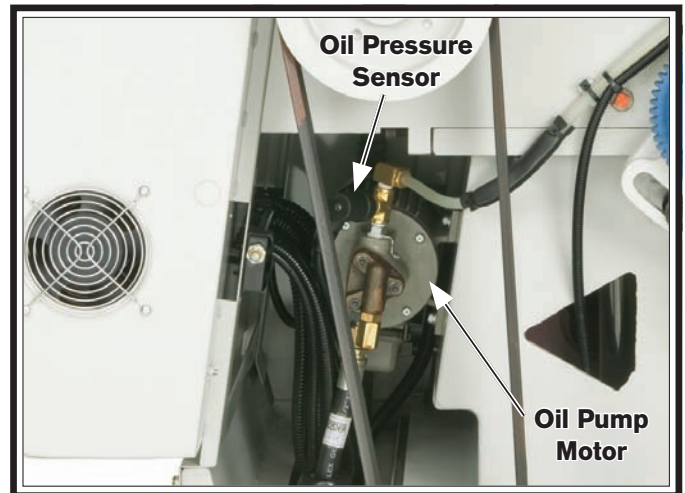
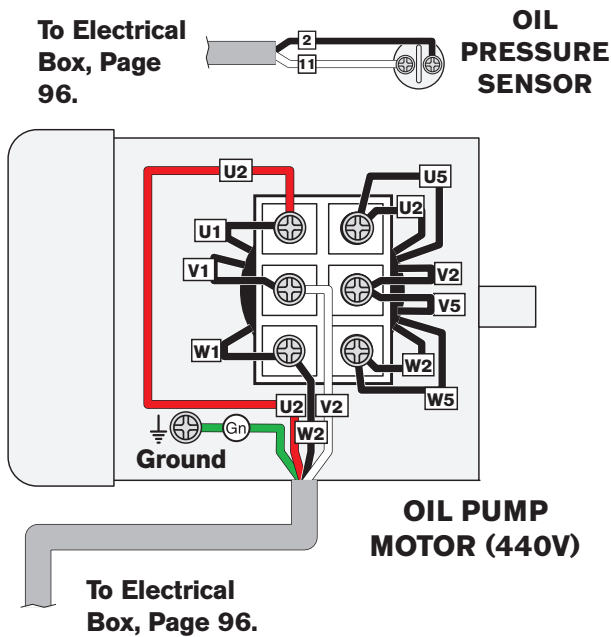


Figure 144. Oil pump motor & pressure sensor location.

Coolant Pump Wiring

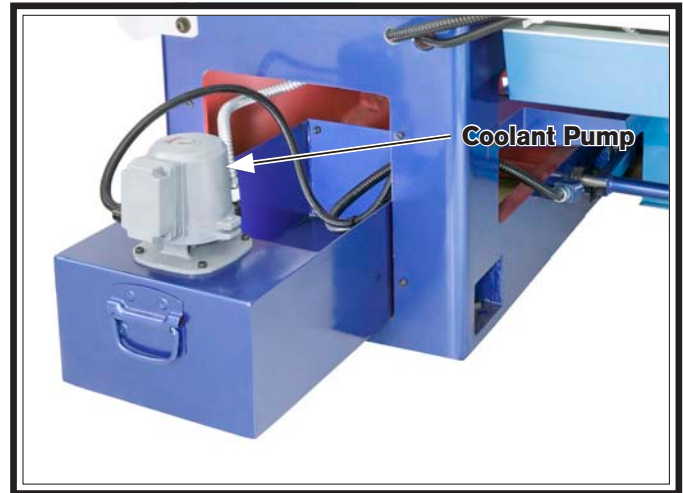
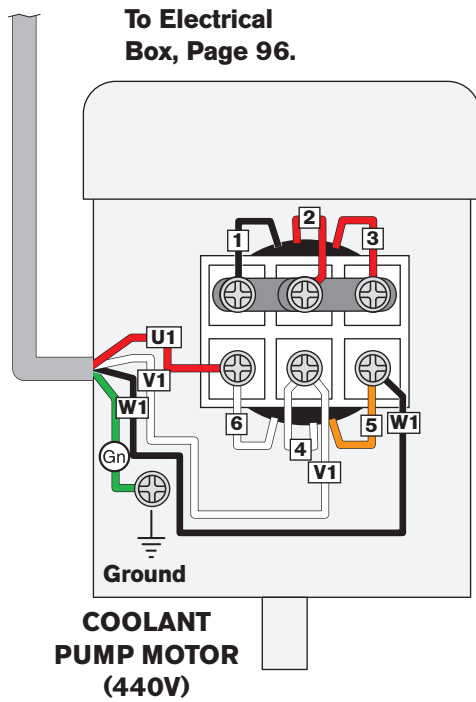


Figure 146. SB1036 coolant pump location.

Spindle ON/OFF Switch

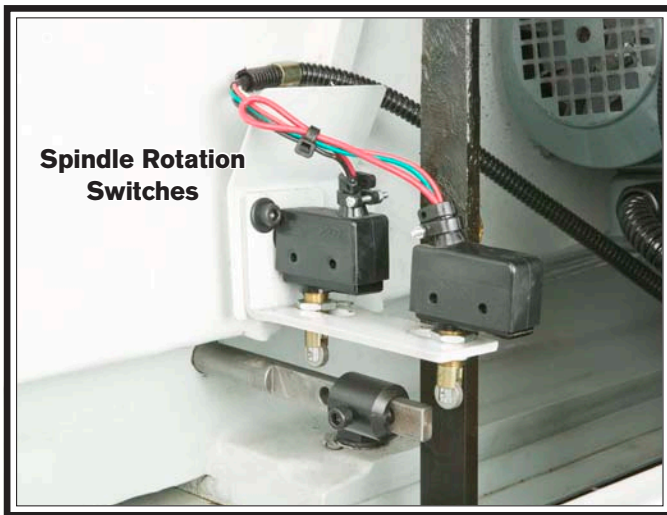
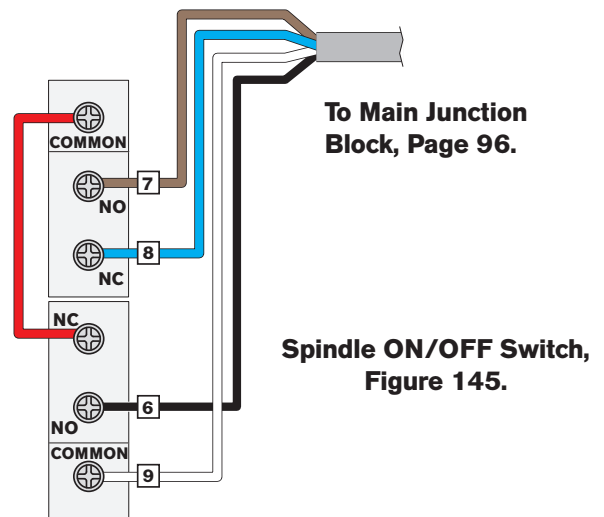


Figure 145. Spindle rotation switch location.

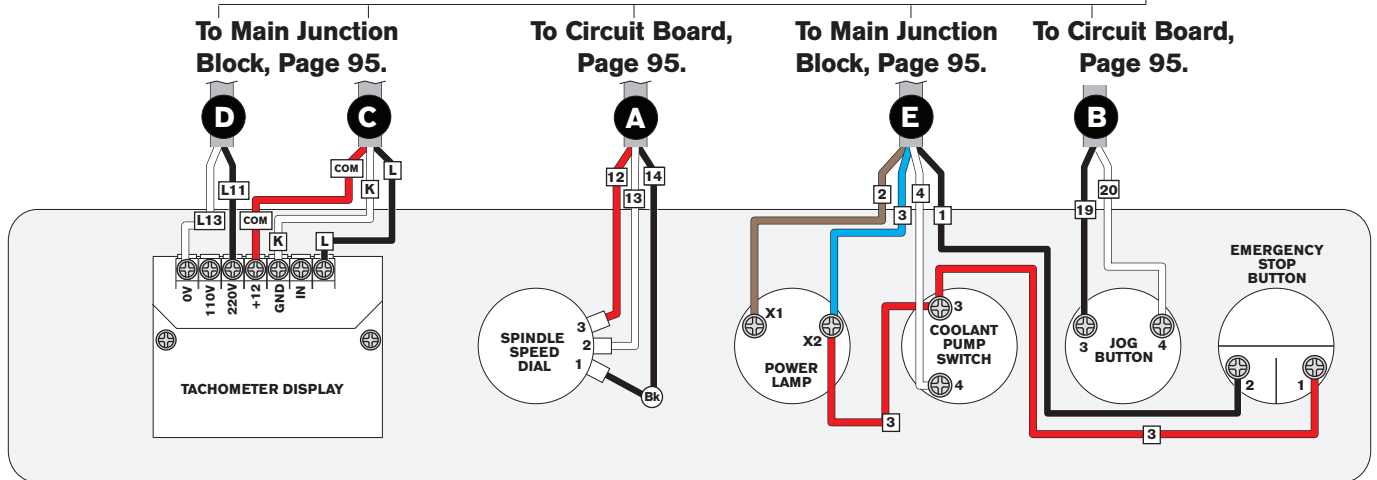


Control Panel Wiring

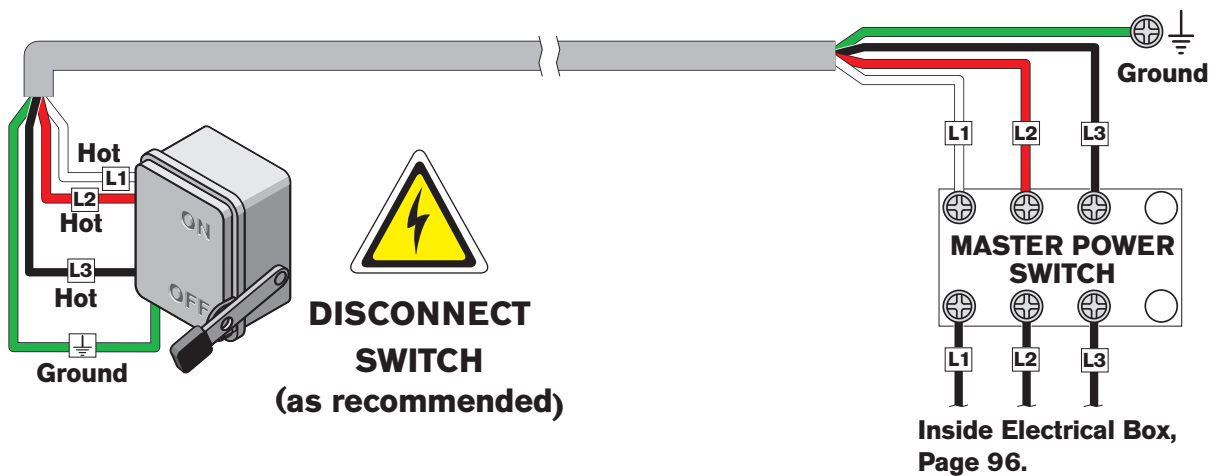


Figure 147. Control panel wiring.

To Electrical Box, Page 95.



Power Connection



Additional Component Wiring



Figure 148. RPM sensor and end gear cover safety switch location.

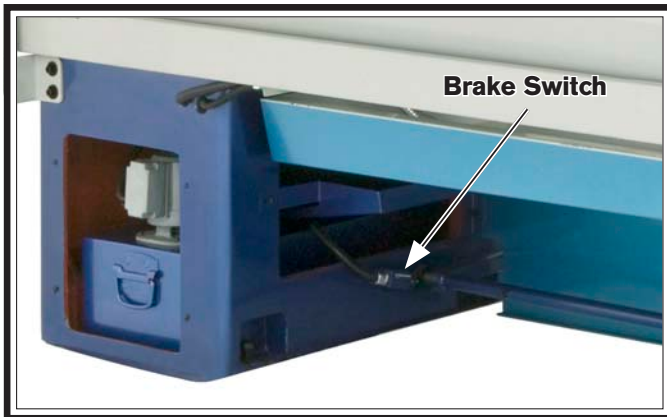
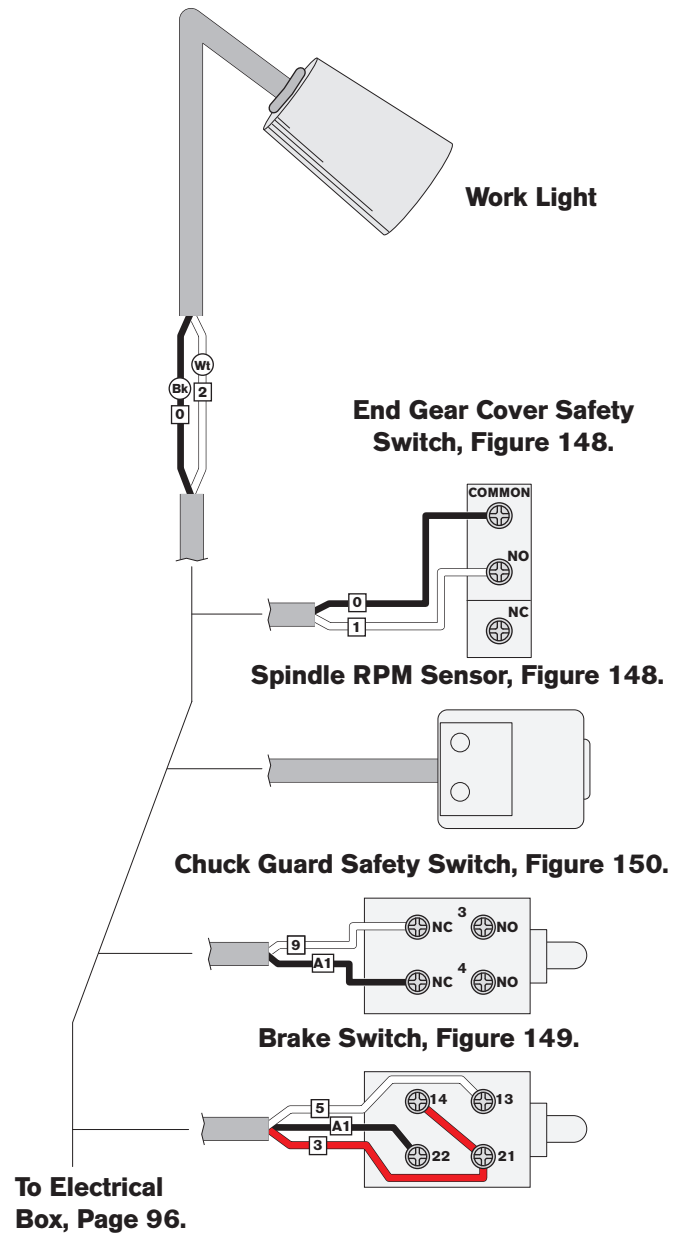


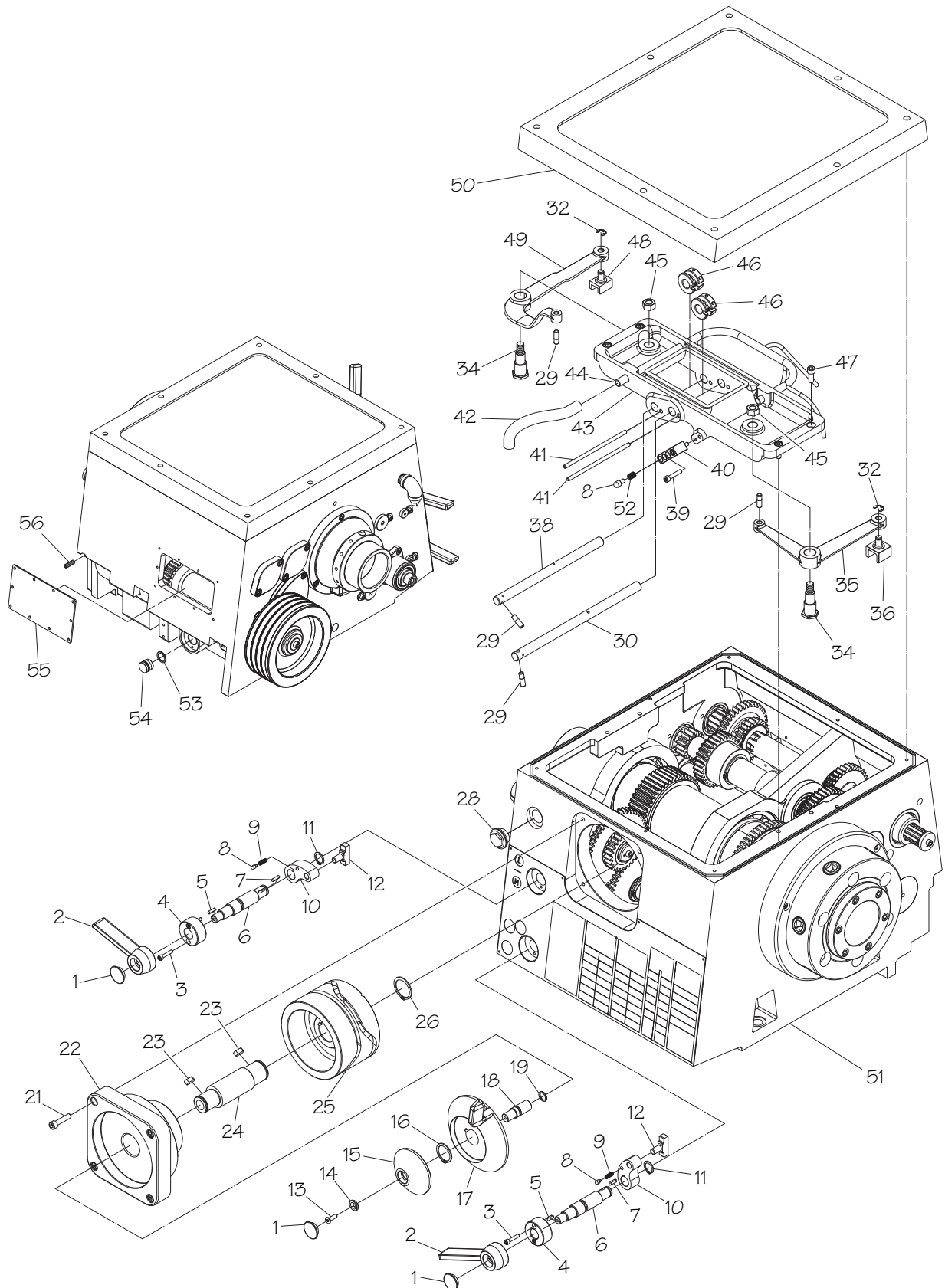
Figure 149. Brake switch location.



Figure 150. Chuck guard limit switch.



Headstock Housing

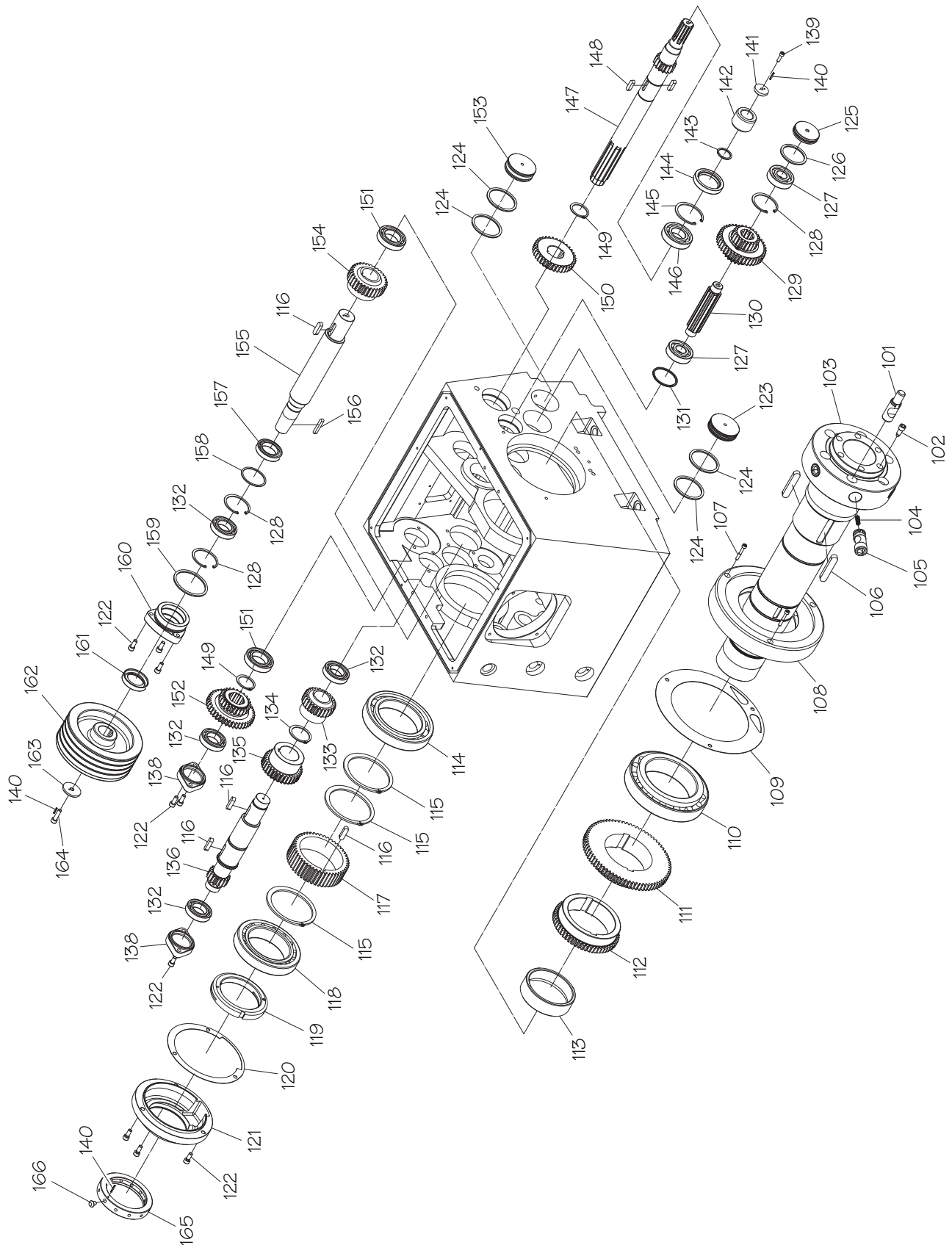


Headstock Housing Parts List

REF	PART #	DESCRIPTION
1	PSB1042PF0001	LEVER END PLUG
2	PSB1042PF0002	LEVER
3	PCAP38M	CAP SCREW M5-.8 X 25
4	PSB1042PF0004	CONNECTING COLLAR
5	PK47M	KEY 4 X 4 X 15
6	PSB1042PF0006	SHAFT
7	PK48M	KEY 4 X 4 X 20
8	PSB1042PF0008	PLUNGER
9	PSB1042PF0009	COMPRESSION SPRING
10	PSB1042PF0010	ROCKER ARM
11	PRO7M	EXT RETAINING RING 18MM
12	PSB1042PF0012	SHIFT CLAW
13	PFH06M	FLAT HD SCR M6-1 X 20
14	PSB1042PF0014	SELECTOR FLAT WASHER
15	PSB1042PF0015	SPEED SELECTOR HUB
16	PR15M	EXT RETAINING RING 30MM
17	PSB1042PF0017	RANGE SELECTOR HUB
18	PSB1042PF0018	CAM SHAFT
19	PSB1042PF0019	O-RING G14
21	PCAP40M	CAP SCREW M8-1.25 X 35
22	PSB1042PF0022	CAM COVER
23	PK82M	KEY 7 X 7 X 18
24	PSB1042PF0024	CAM SHAFT
25	PSB1042PF0025	CAM
26	PR12M	EXT RETAINING RING 35MM
28	PSB1042PF0028	OIL SIGHT GLASS

REF	PART #	DESCRIPTION
29	PSB1042PF0029	PIVOT STOP PIN
30	PSB1042PF0030	LONG ROD
32	PECO3M	E-CLIP 10MM
34	PSB1042PF0034	STEPPED PIVOT BOLT
35	PSB1042PF0035	SHIFT PIVOT ARM
36	PSB1042PF0036	SHIFT FORK
38	PSB1042PF0038	SHORT ROD
39	PCAP07M	CAP SCREW M6-1 X 30
40	PSB1042PF0040	BRACKET
41	PSB1042PF0041	SHAFT
42	PSB1042PF0042	NYLON TUBE
43	PSB1042PF0043	LEVER SUPPORT FRAME ASSEMBLY
44	PSB1042PF0044	OIL PIPE
45	PN09M	HEX NUT M12-1.75
46	PSB1042PF0046	SHIFT COLLAR
47	PCAP14M	CAP SCREW M8-1.25 X 20
48	PSB1042PF0048	SHIFT FORK
49	PSB1042PF0049	SHIFT PIVOT ARM
50	PSB1042PF0050	HEADSTOCK TOP COVER
51	PSB1042PF0051	HEADSTOCK HOUSING
52	PSB1042PF0052	COMPRESSION SPRING
53	PORG035	O-RING 3.1 X 34.4 G35
54	PSB1042PF0054	HOUSING PLUG
55	PSB1042PF0055	HEADSTOCK BACK COVER
56	PSG21M	SET SCREW M8-1.25 X 25

Headstock Gears 1

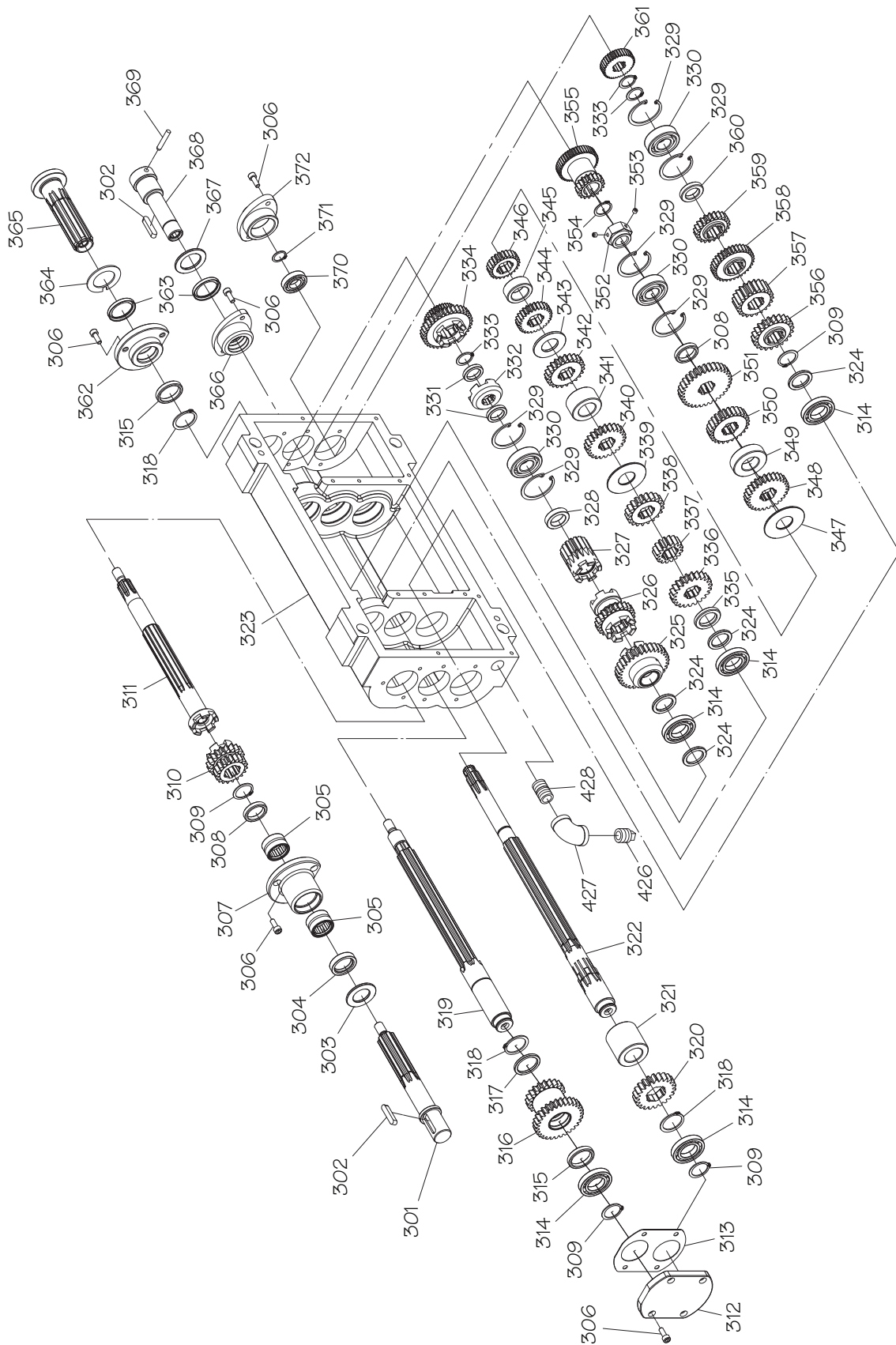


Headstock Gears Parts List

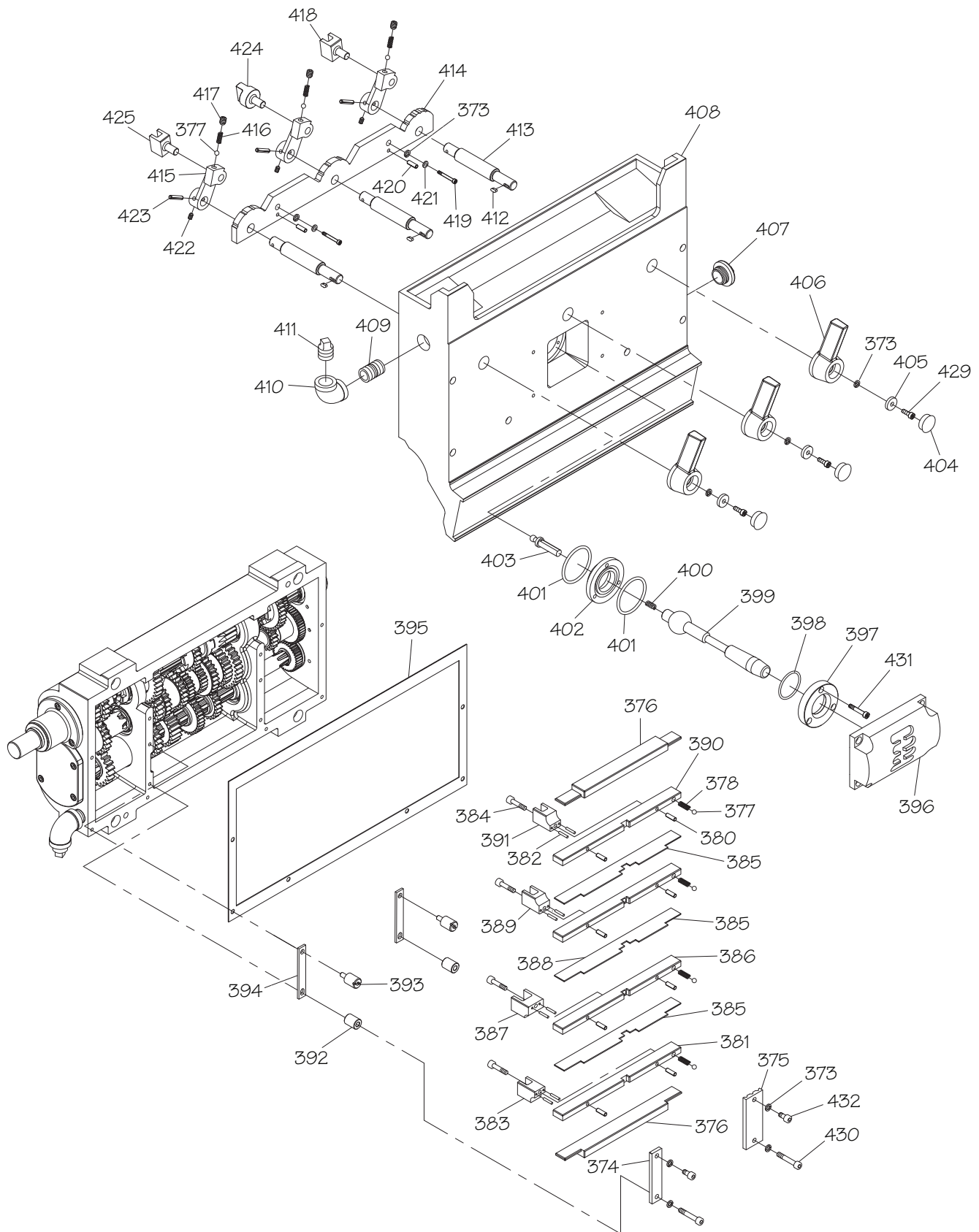
REF	PART #	DESCRIPTION
101	PSB1042PFO101	CAMLOCK STUD
102	PSB1042PFO102	STEPPED CAP SCREW
103	PSB1042PFO103	SPINDLE
104	PSB1042PFO104	COMPRESSION SPRING
105	PSB1042PFO105	CAMLOCK
106	PSB10160106	KEY 15 X 10 X 78
107	PCAP29M	CAP SCREW M6-1 X 40
108	PSB1042PFO108	FRONT BEARING COVER
109	PSB1042PFO109	BEARING COVER GASKET
110	P32026	TAPERED BEARING 32026
111	PSB1042PFO111	GEAR 75T
112	PSB1042PFO112	GEAR 56T
113	PSB1042PFO113	SPACER
114	P6022-OPEN	BALL BEARING 6022 OPEN
115	PR90M	EXT RETAINING RING 110MM
116	PSB10160116	KEY 10 X 8 X 36
117	PSB1042PFO117	GEAR 48T
118	P32021	TAPERED BEARING 32021
119	PSB1042PFO119	SPANNER NUT
120	PSB1042PFO120	END COVER GASKET
121	PSB1042PFO121	OUTBOARD SPINDLE END COVER
122	PCAP14M	CAP SCREW M8-1.25 X 20
123	PSB1042PFO123	HOUSING PLUG
124	PORG065	O-RING 64.4 X 3.1 G65
125	PSB1042PFO125	HOUSING PLUG
126	PORG055	O-RING 54.4 X 3.1 G55
127	P6305-OPEN	BALL BEARING 6305 OPEN
128	PR38M	INT RETAINING RING 62MM
129	PSB1042PFO129	COMBO GEAR 21T/40T
130	PSB1042PFO130	SPLINE SHAFT
131	PSB1042PFO131	SPACER
132	P6007-OPEN	BALL BEARING 6007 OPEN
133	PSB1042PFO133	GEAR 26T
134	PR32M	EXT RETAINING RING 48MM
135	PSB1042PFO135	GEAR 32T
136	PSB1042PFO136	GEAR SHAFT 16T
138	PSB1042PFO138	BEARING COVER
139	PCAP02M	CAP SCREW M6-1 X 20
140	PRP02M	ROLL PIN 3 X 16
141	PSB1042PFO141	GEAR SHAFT FLAT WASHER
142	PSB1042PFO142	SPACER
143	PORP030	O-RING 29.7 X 3.5 P30
144	PSB1042PFO144	OIL SEAL 507212
145	PR64M	INT RETAINING RING 72MM
146	P6207-2RS	BALL BEARING 6207-2RS
147	PSB1042PFO147	GEAR SHAFT 16T
148	PK136M	KEY 8 X 8 X 30
149	PR68M	EXT RETAINING RING 40MM

REF	PART #	DESCRIPTION
150	PSB1042PFO150	GEAR 35T
151	P6008-OPEN	BALL BEARING 6008 OPEN
152	PSB1042PFO152	COMBO GEAR 25T/40T
153	PSB1042PFO153	HOUSING PLUG
154	PSB1042PFO154	GEAR 31T
155	PSB1042PFO155	SHAFT
156	PK62M	KEY 7 X 7 X 45
157	P6908-OPEN	BALL BEARING 6908 OPEN
158	PSB1042PFO158	SPACER
159	PORG075	O-RING 74.4 X 3.1 G75
160	PSB1042PFO160	BEARING SEAT
161	PSB1042PFO161	OIL SEAL 406212
162	PSB1042PFO162	SPINDLE PULLEY
163	PSB1042PFO163	PINNED FLAT WASHER 8MM
164	PCAP13M	CAP SCREW M8-1.25 X 30
165	PSB1042PFO165	SPINDLE SPEED SENSOR RING
166	PSB1042PFO166	SENSOR BUD
186	PSB1042PFO186	O-RING G16
187	PCAP26M	CAP SCREW M6-1 X 12
188	PSB1042PFO188	SHAFT FLAT WASHER 6MM
189	PSB1042PFO189	SHAFT
190	PSB1042PFO190	SHAFT
191	PSB1042PFO191	OIL SEAL 385508
192	PSB1042PFO192	SPLINE SHAFT
193	PSB1042PFO193	BEARING SEAT
194	PSB1042PFO194	SPACER
195	PSB1042PFO195	NEEDLE BEARING 32 X 30
196	PR43M	EXT RETAINING RING 50MM
197	PSB1042PFO197	GEAR 24T
198	PSB1042PFO198	PIPE PLUG 1/2" NPT
199	PSB1042PFO199	PIPE ELBOW 3/4" X 1/2" NPT
200	PSB1042PFO200	PIPE NIPPLE 3/4" X 1-1/4" NPT
201	PSB1042PFO201	SHAFT
202	PSB1042PFO202	DOUBLE GEAR 24T/24T
203	PR37M	EXT RETAINING RING 32MM
204	PSB1042PFO204	SHAFT
205	PSB1042PFO205	COMBO GEAR 24T/48T
206	PSB1042PFO206	SHAFT
207	PSB1042PFO207	COMBO GEAR 48T/24T
208	PCAP01M	CAP SCREW M6-1 X 16
209	PSB1042PFO209	HOUSING PLUG
210	PORG035	O-RING 3.1 X 34.4 G35
211	PR12M	EXT RETAINING RING 35MM
214	PSB1042PFO214	END CAP
215	PSB1042PFO215	BEARING SEAT
216	PSB1042PFO216	SHAFT
217	P6207-OPEN	BALL BEARING 6207 OPEN
218	PSB1042PFO218	PINNED FLAT WASHER 6MM

Gearbox 1



Gearbox 2



Gearbox Parts List

REF	PART #	DESCRIPTION
301	PSB1042PFO301	SHAFT
302	PK109M	KEY 7 X 7 X 35
303	PSB1042PFO303	SPACER
304	PSB1042PFO304	OIL SEAL 253708
305	PSB1042PFO305	NEEDLE BEARING
306	PCAP01M	CAP SCREW M6-1 X 16
307	PSB1042PFO307	BEARING SEAT
308	PSB1042PFO308	SPACER
309	PR11M	EXT RETAINING RING 25MM
310	PSB1042PFO310	DOUBLE GEAR 19T/19T
311	PSB1042PFO311	SHAFT
312	PSB1042PFO312	END COVER
313	PSB1042PFO313	GASKET
314	P6005-OPEN	BALL BEARING 6005 OPEN
315	PSB1042PFO315	SPACER
316	PSB1042PFO316	DOUBLE GEAR 20T/30T
317	PSB1042PFO317	SPACER
318	PR15M	EXT RETAINING RING 30MM
319	PSB1042PFO319	SHAFT
320	PSB1042PFO320	GEAR 22T
321	PSB1042PFO321	SPACER
322	PSB1042PFO322	SHAFT
323	PSB1042PFO323	GEARBOX HOUSING
324	PSB1042PFO324	SPACER
325	PSB1042PFO325	GEAR 32T
326	PSB1042PFO326	GEAR 23T
327	PSB1042PFO327	GEAR 16T
328	PSB1042PFO328	SPACER
329	PR25M	INT RETAINING RING 47MM
330	P6204-OPEN	BALL BEARING 6204 OPEN
331	PSB1042PFO331	SPACER
332	PSB1042PFO332	CLUTCH
333	PRO9M	EXT RETAINING RING 20MM
334	PSB1042PFO334	DOUBLE GEAR 35T/35T
335	PSB1042PFO335	SPACER
336	PSB1042PFO336	GEAR 22T
337	PSB1042PFO337	GEAR 16T
338	PSB1042PFO338	GEAR 20T
339	PSB1042PFO339	SPACER
340	PSB1042PFO340	GEAR 24T
341	PSB1042PFO341	SPACER
342	PSB1042PFO342	GEAR 23T
343	PSB1042PFO343	SPACER
344	PSB1042PFO344	GEAR 27T
345	PSB1042PFO345	SPACER
346	PSB1042PFO346	GEAR 24T
347	PSB1042PFO347	SPACER
348	PSB1042PFO348	GEAR 28T
349	PSB1042PFO349	SPACER
350	PSB1042PFO350	GEAR 26T
351	PSB1042PFO351	GEAR 32T
352	PSB1042PFO352	LOCK COLLAR
353	PS602M	SET SCREW M6-1 X 6

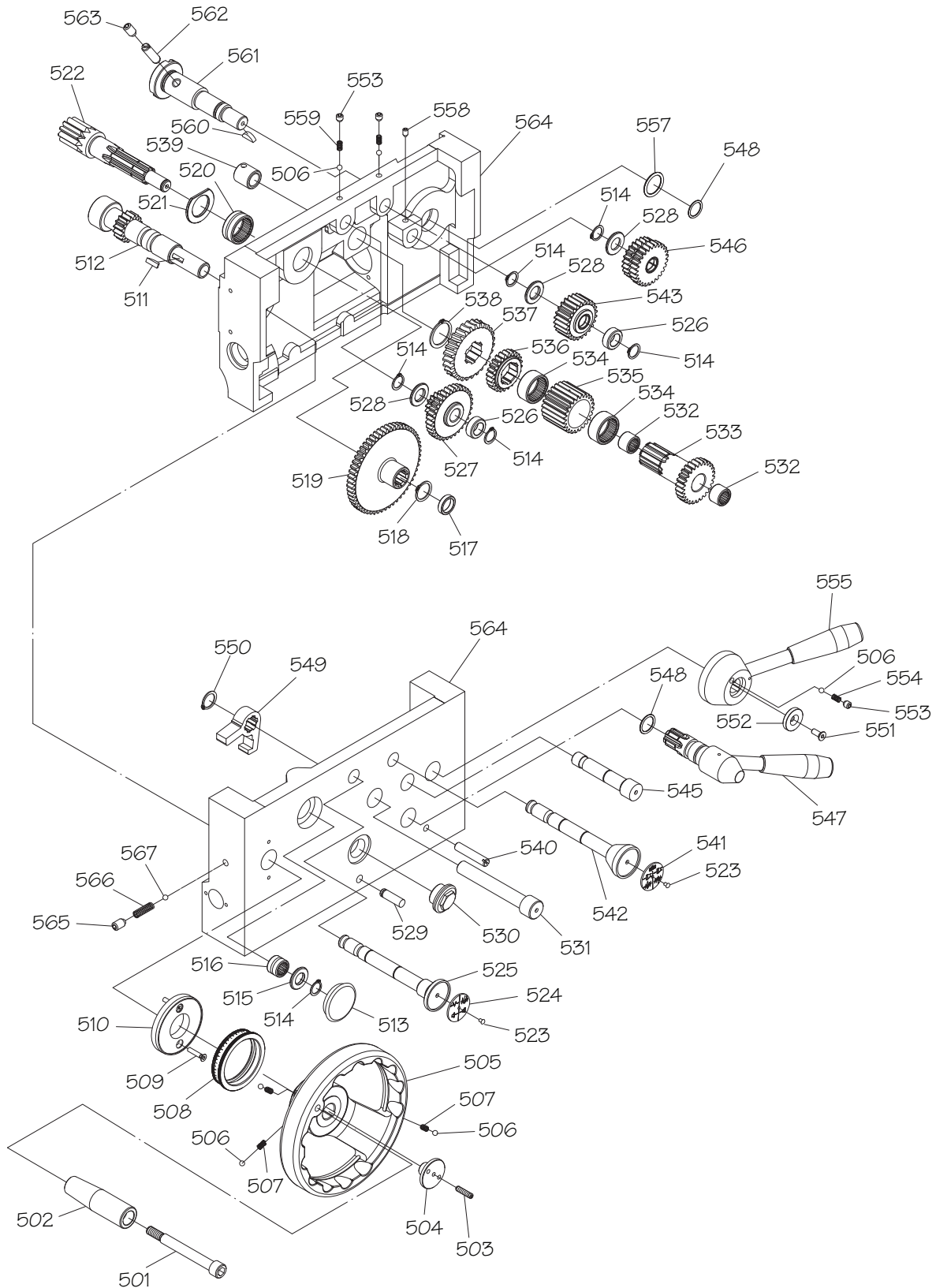
REF	PART #	DESCRIPTION
354	PR10M	EXT RETAINING RING 22MM
355	PSB1042PFO355	DOUBLE GEAR 45T/18T
356	PSB1042PFO356	GEAR 22T
357	PSB1042PFO357	GEAR 22T
358	PSB1042PFO358	GEAR 33T
359	PSB1042PFO359	GEAR 22T
360	PSB1042PFO360	SPACER
361	PSB1042PFO361	GEAR 36T
362	PSB1042PFO362	SHAFT BRACKET
363	PSB1042PFO363	OIL SEAL 304005
364	PSB1042PFO364	SHEAR PIN COVER
365	PSB1042PFO365	SHAFT
366	PSB1042PFO366	SHAFT BRACKET
367	PSB1042PFO367	SPACER
368	PSB1042PFO368	SHAFT
369	PRP31M	ROLL PIN 6 X 36
370	P6003-OPEN	BALL BEARING 6003 OPEN
371	PR18M	EXT RETAINING RING 17MM
372	PSB1042PFO372	BEARING SEAT
373	PLW03M	LOCK WASHER 6MM
374	PSB1042PFO374	SHOULDER PLATE
375	PSB1042PFO375	REVERSE-STOP
376	PSB1042PFO376	OUTER PLATE
377	PSTB001	STEEL BALL 1/4"
378	PSB1042PFO378	COMPRESSION SPRING
380	PRP24M	ROLL PIN 5 X 16
381	PSB1042PFO381	FORK SUPPORT
382	PRP24M	ROLL PIN 5 X 16
383	PSB1042PFO383	SHIFT FORK
384	PCAP15M	CAP SCREW M5-.8 X 20
385	PSB1042PFO385	PARTITION
386	PSB1042PFO386	FORK SUPPORT
387	PSB1042PFO387	SHIFT FORK
388	PSB1042PFO388	FORK SUPPORT
389	PSB1042PFO389	SHIFT FORK
390	PSB1042PFO390	FORK SUPPORT
391	PSB1042PFO391	SHIFT FORK
392	PSB1042PFO392	SPACER
393	PSB1042PFO393	PARTITION SCREW
394	PSB1042PFO394	FIXED PLATE
395	PSB1042PFO395	GEARBOX HOUSING GASKET
396	PSB1042PFO396	SHIFT GATE
397	PSB1042PFO397	SELECTOR LEVER COVER
398	PORG035	O-RING 3.1 X 34.4 G35
399	PSB1042PFO399	SELECTOR LEVER
400	PSB1042PFO400	COMPRESSION SPRING
401	PORG040	O-RING 39.4 X 3.1 G40
402	PSB1042PFO402	SELECTOR LEVER SUPPORT
403	PSB1042PFO403	SELECTOR SHAFT
404	PSB1042PFO404	HANDLE PLUG
405	PSB1042PFO405	HANDLE FLAT WASHER 6MM
406	PSB1042PFO406	HANDLE
407	PSB1042PFO028	OIL SIGHT GLASS

Gearbox Parts List

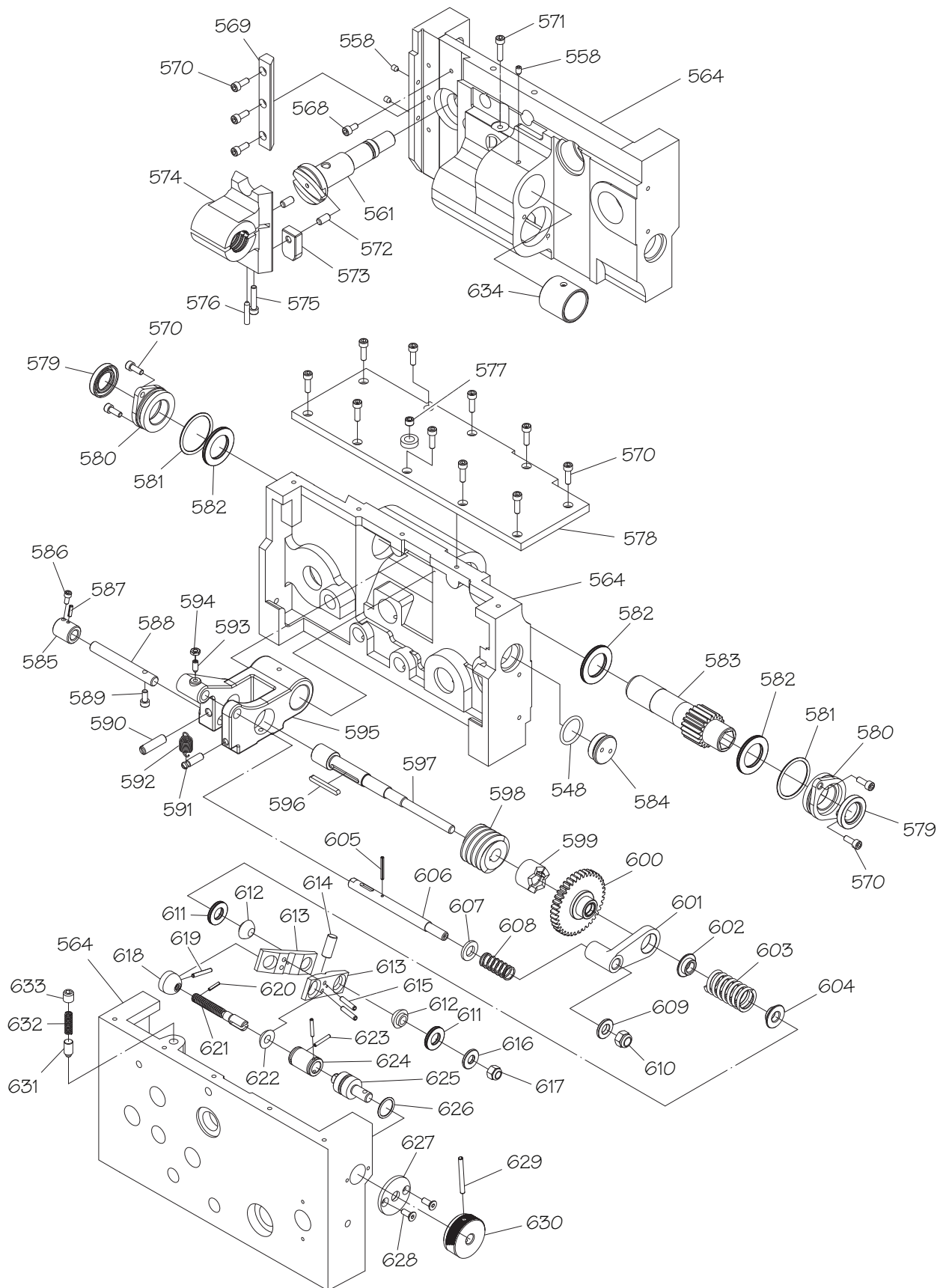
REF	PART #	DESCRIPTION
408	PSB1042PFO408	GEARBOX FRONT COVER
409	PSB1042PFO409	PIPE NIPPLE 3/4" NPT
410	PSB1042PFO410	PIPE ELBOW 3/4" NPT
411	PSB1042PFO411	PIPE PLUG 3/4" NPT
412	PK05M	KEY 4 X 4 X 10
413	PSB1042PFO413	SHAFT
414	PSB1042PFO414	SELECTOR BAR
415	PSB1042PFO415	PIVOT ARM
416	PSB1042PFO416	COMPRESSION SPRING
417	PS520M	SET SCREW M8-1.25 X 8
418	PSB1042PFO418	SHIFT FORK
419	PCAP02M	CAP SCREW M6-1 X 20
420	PRP24M	ROLL PIN 5 X 16

REF	PART #	DESCRIPTION
421	PW03M	FLAT WASHER 6MM
422	PS502M	SET SCREW M6-1 X 6
423	PRP04M	ROLL PIN 4 X 24
424	PSB1042PFO424	SHIFT TAB
425	PSB1042PFO425	SHIFT FORK
426	PSB1042PFO426	PIPE PLUG 1/2" NPT
427	PSB1042PFO427	PIPE ELBOW 1/2" NPT
428	PSB1042PFO428	PIPE NIPPLE 1/2" NPT
429	PCAP26M	CAP SCREW M6-1 X 12
430	PCAP29M	CAP SCREW M6-1 X 40
431	PCAP38M	CAP SCREW M5-.8 X 25
432	PCAP01M	CAP SCREW M6-1 X 16

Apron 1



Apron 2



Apron Parts List

REF	PART #	DESCRIPTION
501	PSB1042PF0501	HANDLE CAP SCREW
502	PSB1042PF0502	HANDWHEEL HANDLE
503	PS512M	SET SCREW M6-1 X 25
504	PSB1042PF0504	HANDWHEEL RETAINER
505	PSB1042PF0505	CARRIAGE HANDWHEEL
506	PSTB001	STEEL BALL 1/4
507	PSB1042PF0507	COMPRESSION SPRING
508	PSB1042PF0508	CARRIAGE GRADUATED DIAL
509	PFH72M	FLAT HD CAP SCR M5-.8 X 12
510	PSB1042PF0510	SHAFT BRACKET
511	PSB10120218	WOODRUFF KEY 5 X 19
512	PSB1042PF0512	GEAR SHAFT
513	PSB1042PF0513	HOUSING PLUG
514	PR07M	EXT RETAINING RING 18MM
515	PSB1042PF0515	THRUST WASHER
516	PSB1042PF0516	NEEDLE BEARING 18/20
517	PSB1042PF0517	SPACER
518	PR11M	EXT RETAINING RING 25MM
519	PSB1042PF0519	GEAR 56T
520	PSB1042PF0520	NEEDLE BEARING 28/20
521	PSB1042PF0521	SPACER
522	PSB1042PF0522	GEAR SHAFT
523	PR1006M	STEEL BLIND RIVET 3 X 10MM
524	PSB1042PF0524	FEED SELECTION ID PLATE
525	PSB1042PF0525	FEED SELECTION SHAFT
526	PSB1042PF0526	COLLAR
527	PSB1042PF0527	DOUBLE GEAR 15T/33T
528	PSB1042PF0528	COLLAR
529	PSB1042PF0529	STEPPED DOWEL PIN
530	PSB1042PF0028	SIGHT GLASS
531	PSB1042PF0531	SHAFT
532	PSB1042PF0532	NEEDLE BEARING TL1616
533	PSB1042PF0533	GEAR SHAFT 26T
534	PSB1042PF0534	NEEDLE BEARING TL3016
535	PSB1042PF0535	GEAR 24T
536	PSB1042PF0536	GEAR 24T
537	PSB1042PF0537	BEVEL GEAR
538	PR15M	EXT RETAINING RING 30MM
539	PSB1042PF0539	BUSHING
540	PSB1042PF0540	ALIGNMENT PIN
541	PSB1042PF0541	FEED DIRECTION ID PLATE
542	PSB1042PF0542	FEED DIRECTION SHAFT
543	PSB1042PF0543	GEAR 24T
545	PSB1042PF0545	SHAFT
546	PSB1042PF0546	DOUBLE GEAR 24T/26T
547	PSB1042PF0547	FEED ON/OFF LEVER ASSEMBLY
548	PORP021	O-RING 20.8 X 2.4 P21
549	PSB1042PF0549	PIVOT FORK
550	PR81M	EXT RETAINING RING 21MM
551	PFH73M	FLAT HD CAP SCR M6-1 X 16
552	PSB1042PF0552	LEVER RETAINER
553	PS520M	SET SCREW M8-1.25 X 8
554	PSB1042PF0554	COMPRESSION SPRING

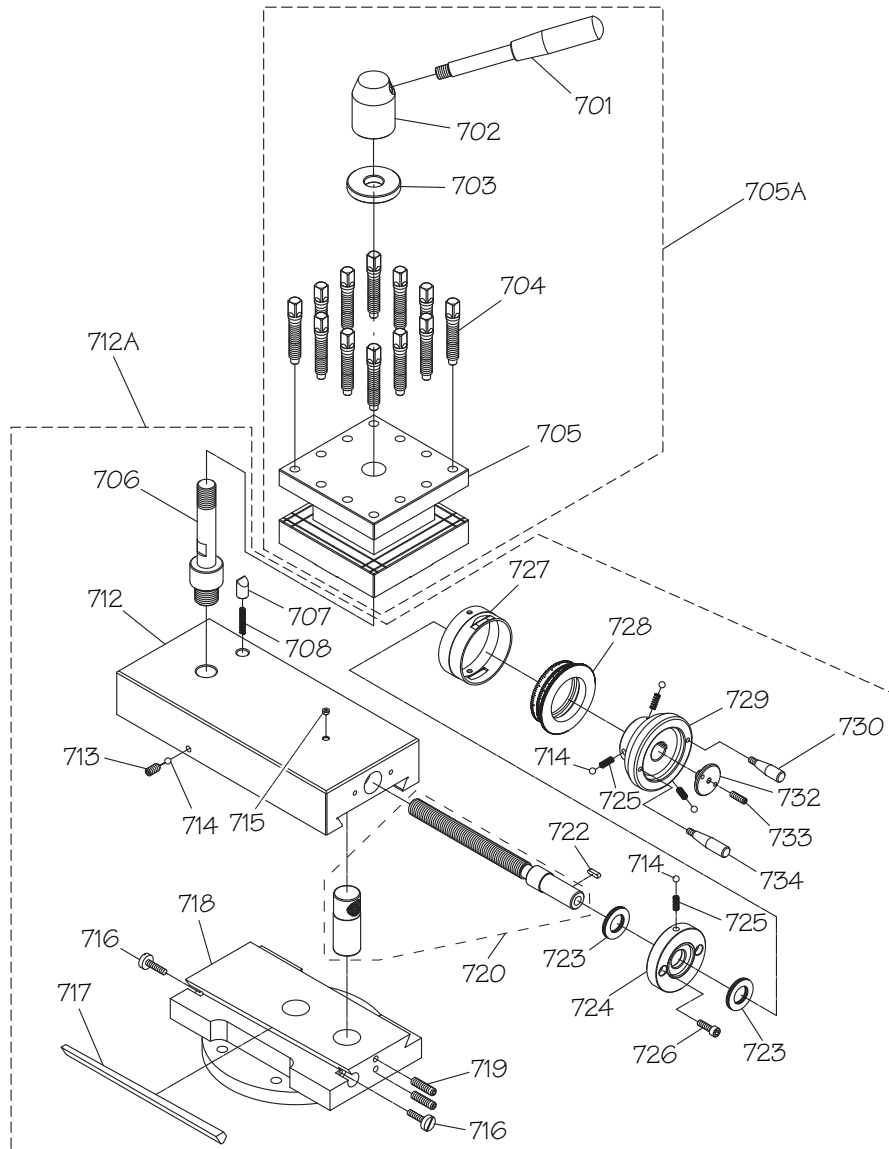
REF	PART #	DESCRIPTION
555	PSB1042PF0555	HALF NUT LEVER ASSEMBLY
557	PSB1042PF0557	O-RING G25
558	PS503M	SET SCREW M6-1 X 8
559	PSB1042PF0559	COMPRESSION SPRING
560	PSB1042PF0560	WOODRUFF KEY 5 X 16
561	PSB1042PF0561	CAM SHAFT
562	PS584M	SET SCREW M10-1.5 X 35
563	PS530M	SET SCREW M10-1.5 X 10
564	PSB1042PF0564	APRON HOUSING 2PC
565	PS5113M	SET SCREW M10-1.5 X 6
566	PSB1042PF0566	COMPRESSION SPRING
567	PSTB003	STEEL BALL 3/8
568	PCAP26M	CAP SCREW M6-1 X 12
569	PSB1042PF0569	HALF NUT GIB
570	PCAP01M	CAP SCREW M6-1 X 16
571	PCAP07M	CAP SCREW M6-1 X 30
572	PSB1042PF0572	DOWEL PIN
573	PSB1042PF0573	SIDE PLATE
574	PSB1042PF0574	HALF NUT
575	PCAP07M	CAP SCREW M6-1 X 30
576	PS528M	SET SCREW M6-1 X 30
577	PSB1042PF0577	PLUG 1/4" NPT
578	PSB1042PF0578	TOP PLATE
579	PSB1042PF0579	OIL SEAL 30 X 40 X 5
580	PSB1042PF0580	SHAFT BRACKET
581	PORG045	O-RING 44.4 X 3.1 G45
582	PSB1042PF0582	THRUST BEARING NTB3047/A52
583	PSB1042PF0583	PINION
584	PSB1042PF0584	HOUSING PLUG
585	PSB1042PF0585	LOCK COLLAR
586	PCAP26M	CAP SCREW M6-1 X 12
587	PRP76M	ROLL PIN 4 X 16
588	PSB1042PF0588	RETAINING PIN
589	PCAP38M	CAP SCREW M5-.8 X 25
590	PSB1042PF0590	SLOTTED DOWEL PIN
591	PSB1042PF0591	CAPTIVE PIN
592	PSB1042PF0592	EXTENSION SPRING
593	PS591M	SET SCREW M6-1 X 14
594	PLN03M	LOCK NUT M6-1
595	PSB1042PF0595	PIVOT BRACKET
596	PK33M	KEY 5 X 5 X 45
597	PSB1042PF0597	SHAFT
598	PSB1042PF0598	WORM
599	PSB1042PF0599	CLUTCH
600	PSB1042PF0600	CLUTCH GEAR
601	PSB1042PF0601	PIVOT ARM
602	PSB1042PF0602	SPRING RETAINER
603	PSB1042PF0603	COMPRESSION SPRING
604	PSB1042PF0604	SPRING RETAINER
605	PRP04M	ROLL PIN 4 X 24
606	PSB1042PF0606	TRIP ROD
607	PSB1042PF0607	SPRING RETAINER
608	PSB1042PF0608	COMPRESSION SPRING

Apron Parts List

REF	PART #	DESCRIPTION
609	PSB1042PFO609	SPACER
610	PLN09M	LOCK NUT M12-1.75
611	PSB1042PFO611	THRUST BEARING NTB1528/A52
612	PSB1042PFO612	DOMED BEARING
613	PSB1042PFO613	CLAMP PLATE 2PC
614	PSB1042PFO614	DOWEL PIN
615	PRP05M	ROLL PIN 5 X 30
616	PSB1042PFO616	SPACER
617	PLN05M	LOCK NUT M10-1.5
618	PSB1042PFO618	DOMED BEARING
619	PRP04M	ROLL PIN 4 X 24
620	PRP02M	ROLL PIN 3 X 16
621	PSB1042PFO621	THREADED SHAFT

REF	PART #	DESCRIPTION
622	PSB1042PFO622	DOMED BEARING
623	PRP105M	ROLL PIN 3 X 24
624	PSB1042PFO624	COUPLING
625	PSB1042PFO625	SHAFT
626	PORP018	O-RING 17.8 X 2.4 P18
627	PSB1042PFO627	END PLATE
628	PFH74M	FLAT HD CAP SCR M5-.8 X 16
629	PRP10M	ROLL PIN 5 X 36
630	PSB1042PFO630	KNURLED KNOB
631	PSB1042PFO631	STEPPED DOWEL PIN
632	PSB1042PFO632	COMPRESSION SPRING
633	PSS15M	SET SCREW M12-1.75 X 12
634	PSB1042PFO634	BUSHING

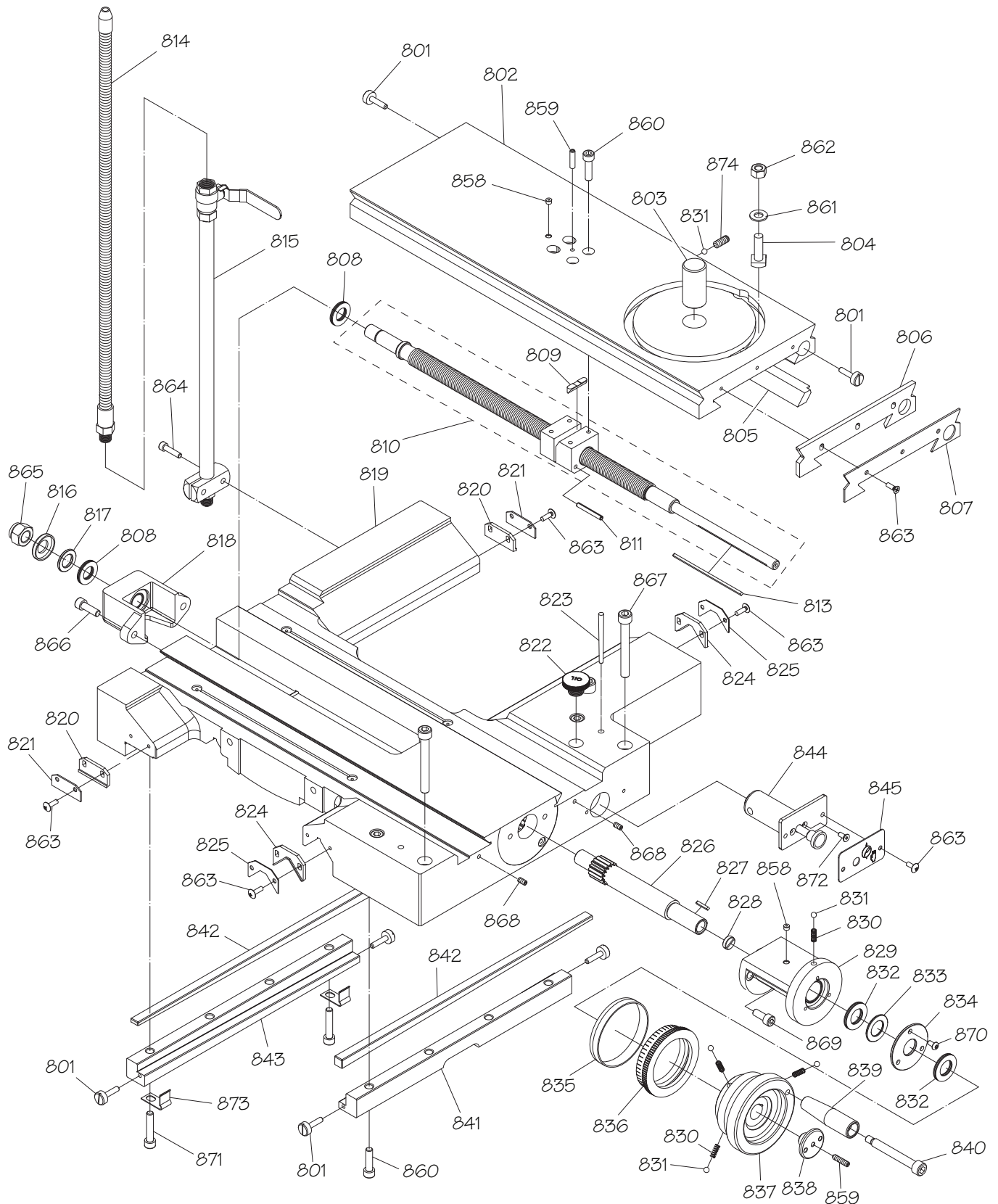
Tool Post & Compound Rest



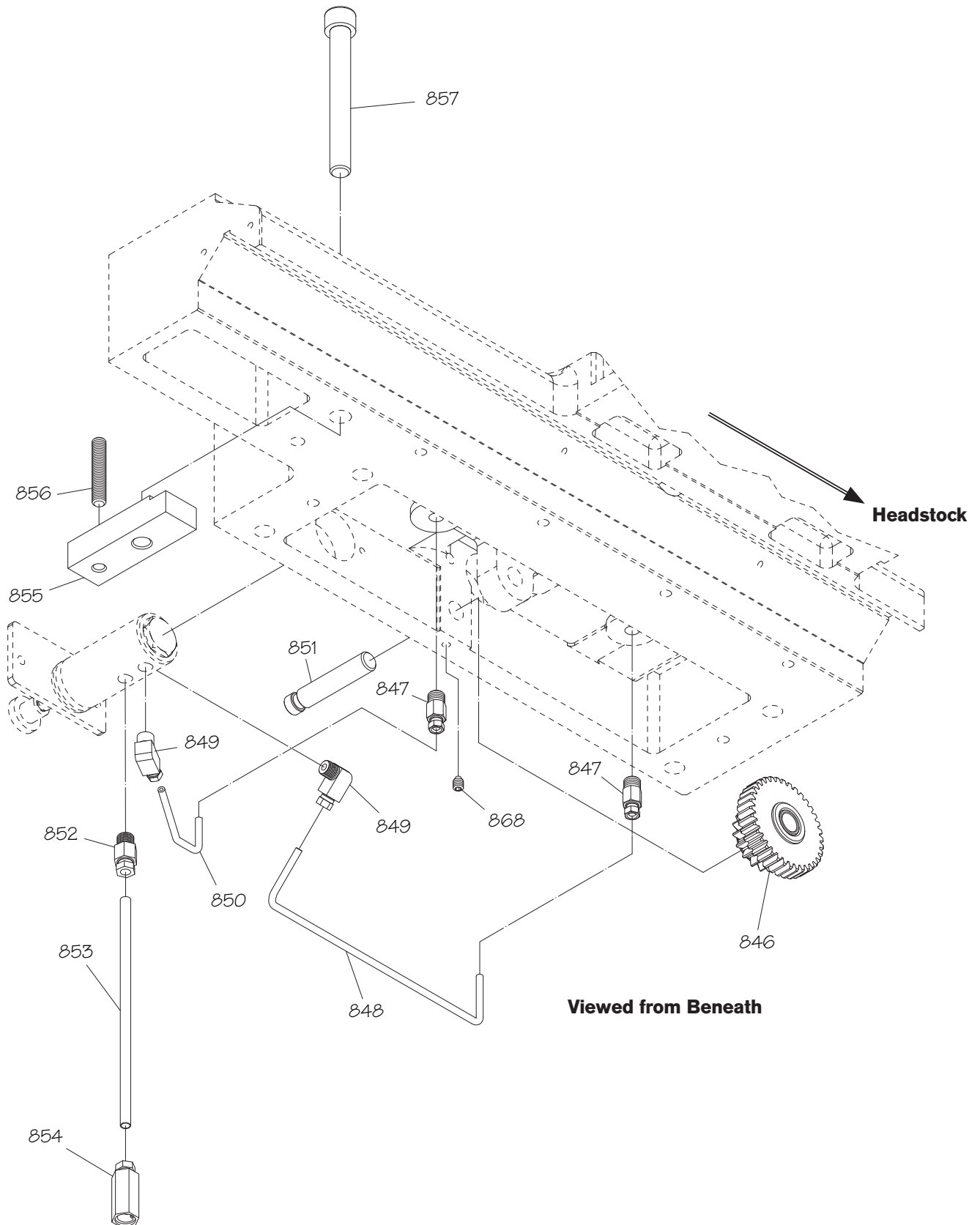
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701	PSB1042PF0701	HANDLE
702	PSB1042PF0702	4-WAY TOOL POST NUT
703	PSB1042PF0703	COLLAR
704	PSB1042PF0704	4-WAY TOOL POST BOLT
705	PSB1042PF0705	4-WAY TOOL POST BODY
705A	PSB1042PF0705A	4-WAY TOOL POST ASSEMBLY
706	PSB1042PF0706	4-WAY TOOL POST SHAFT
707	PSB1042PF0707	PLUNGER
708	PSB1042PF0708	COMPRESSION SPRING
712A	PSB1042PF0712A	COMPOUND REST ASSEMBLY
712	PSB1042PF0712	COMPOUND REST BODY
713	PSG06M	SET SCREW M8-1.25 X 16
714	PSTB001	STEEL BALL 1/4
715	PLUBE001	TAP-IN BALL OILER 1/4
716	PSB1042PF0716	GIB SCREW
717	PSB1042PF0717	COMPOUND REST GIB

REF	PART #	DESCRIPTION
718	PSB1042PF0718	SWIVEL BASE
719	PSG19M	SET SCREW M8-1.25 X 30
720	PSB1042PF0720	LEADSCREW W/NUT
722	PK47M	KEY 4 X 4 X 15
723	PSB1042PF0723	THRUST BEARING NTB/AS2 2035
724	PSB1042PF0724	LEADSCREW BRACKET
725	PSB1042PF0725	COMPRESSION SPRING
726	PCAP02M	CAP SCREW M6-1 X 20
727	PSB1042PF0727	DIAL COLLAR
728	PSB1042PF0728	GRADUATED DIAL
729	PSB1042PF0729	COMPOUND REST HANDWHEEL
730	PSB1042PF0730	LONG HANDWHEEL HANDLE
732	PSB1042PF0732	HANDWHEEL RETAINER
733	PSG25M	SET SCREW M6-1 X 20
734	PSB1042PF0734	SHORT HANDWHEEL HANDLE

Saddle & Cross Slide 1



Saddle & Cross Slide 2

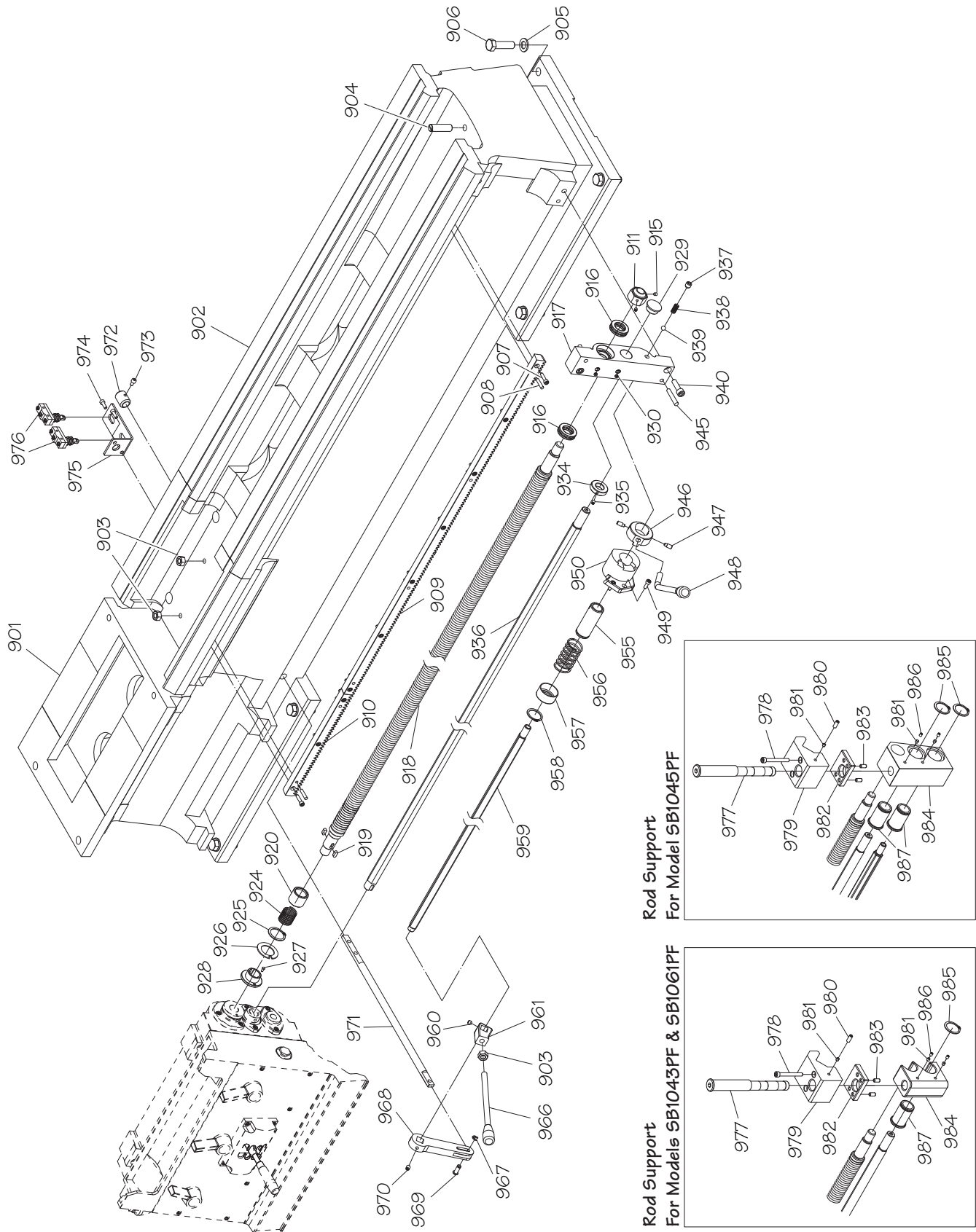


Saddle & Cross Slide Parts List

REF	PART #	DESCRIPTION
801	PSB1042PFO801	GIB SCREW
802	PSB1042PFO802	CROSS SLIDE
803	PSB1042PFO803	PIVOT PIN
804	PSB1042PFO804	T-BOLT
805	PSB1042PFO805	CROSS SLIDE GIB
806	PSB1042PFO806	CROSS SLIDE WIPER
807	PSB1042PFO807	WIPER PLATE
808	PSB1042PFO808	THRUST BEARING NTB/AS2 1730
809	PSB1042PFO809	WEDGE KEY 7 X 7 X 30
810	PSB1042PFO810	LEADSCREW W/NUT
811	PRP28M	ROLL PIN 5 X 40
813	PK178M	KEY 3 X 3 X 115
814	PSB1042PFO814	COOLANT STAND PIPE 3/8" NPT X 24"
815	PSB1042PFO815	COOLANT VALVE 3/8" NPT
816	PSB1042PFO816	LEADSCREW REAR COVER
817	PSB1042PFO817	THRUST WASHER
818	PSB1042PFO818	LEADSCREW REAR BRACKET
819	PSB1042PFO819	SADDLE
820	PSB1042PFO820	SADDLE FLAT WIPER
821	PSB1042PFO821	FLAT WIPER PLATE
822	PSB1042PFO822	OIL CAP
823	PSB10160823	TAPER PIN #6 X 90
824	PSB1042PFO824	SADDLE V-WIPER
825	PSB1042PFO825	V-WIPER PLATE
826	PSB1042PFO826	PINION
827	PK96M	KEY 3 X 3 X 20
828	PSB1042PFO828	PINION END CAP M16-2 X 5
829	PSB1042PFO829	LEADSCREW FRONT BRACKET
830	PSB1042PFO830	COMPRESSION SPRING
831	PSTB001	STEEL BALL 1/4
832	PSB1042PFO723	THRUST BEARING NTB/AS2 2035
833	PSB1042PFO833	THRUST WASHER
834	PSB1042PFO834	RETAINING PLATE
835	PSB1042PFO835	DIAL COLLAR
836	PSB1042PFO836	GRADUATED DIAL
837	PSB1042PFO837	CROSS SLIDE HANDWHEEL
838	PSB1042PFO838	HANDWHEEL RETAINER

REF	PART #	DESCRIPTION
839	PSB1042PFO839	HANDWHEEL HANDLE
840	PSB1042PFO840	HANDLE CAP SCREW
841	PSB1042PFO841	FRONT GIB SUPPORT
842	PSB1042PFO842	SADDLE GIB
843	PSB1042PFO843	REAR GIB SUPPORT
844	PSB1042PFO844	ONE-SHOT OILER ASSEMBLY
845	PSB1042PFO845	ONE-SHOT OILER PLATE
846	PSB1042PFO846	DOUBLE GEAR 16T/36T
847	PSB1042PFO847	PIPE STRAIGHT ADAPTER 1/8" NPT X 4MM
848	PSB1042PFO848	OIL TUBE ALUMINUM 4 X 258MM
849	PSB1042PFO849	PIPE ELBOW ADAPTER 1/8" NPT X 4MM
850	PSB1042PFO850	OIL TUBE ALUMINUM 4 X 121MM
851	PSB1042PFO851	SHAFT
852	PSB1042PFO852	PIPE STRAIGHT ADAPTER 1/8" NPT X 6MM
853	PSB1042PFO853	OIL TUBE ALUMINUM 6 X 175MM
854	PSB1042PFO854	OIL FILTER 6MM
855	PSB1042PFO855	CLAMP PLATE
856	PSS44M	SET SCREW M8-1.25 X 40
857	PCAP187M	CAP SCREW M12-1.75 X 85
858	PLUBE001	TAP-IN BALL OILER 1/4
859	PSS12M	SET SCREW M6-1 X 25
860	PCAP13M	CAP SCREW M8-1.25 X 30
861	PWO4M	FLAT WASHER 10MM
862	PNO2M	HEX NUT M10-1.5
863	PSO8M	PHLP HD SCR M5-.8 X 12
864	PCAP06M	CAP SCREW M6-1 X 25
865	PN13M	HEX NUT M16-2
866	PCAP38M	CAP SCREW M5-.8 X 25
867	PCAP188M	CAP SCREW M10-1.5 X 80
868	PSS03M	SET SCREW M6-1 X 8
869	PCAP14M	CAP SCREW M8-1.25 X 20
870	PSO9M	PHLP HD SCR M5-.8 X 10
871	PCAP12M	CAP SCREW M8-1.25 X 40
872	PFH72M	FLAT HD CAP SCR M5-.8 X 12
873	PSB1042PFO873	GIB HOLDER
874	PSS09M	SET SCREW M8-1.25 X 20

Bed & Shafts

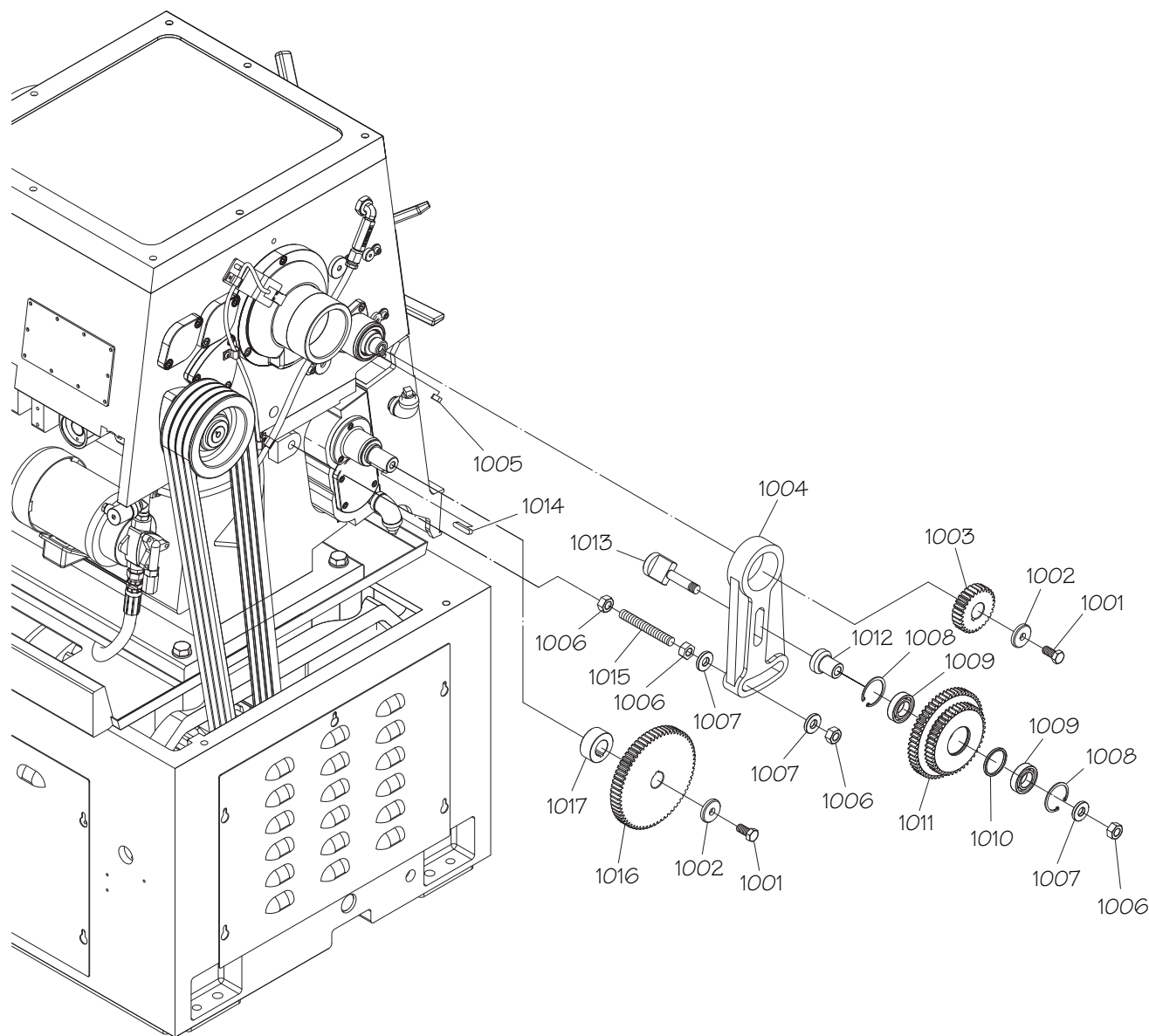


Bed & Shafts Parts List

REF	PART #	DESCRIPTION
901	P5B1042PF0901	BED GAP PIECE (SB1042PF, -60PF)
901	P5B1043PF0901	BED GAP PIECE (SB1043PF, -61PF)
901	P5B1045PF0901	BED GAP PIECE (SB1045PF)
901	P5B1059F0901	BED GAP PIECE (SB1059F)
902	P5B1042PF0902	BED (SB1042PF, -60PF)
902	P5B1043PF0902	BED (SB1043PF, -61PF)
902	P5B1045PF0902	BED (SB1045PF)
902	P5B1059F0902	BED (SB1059F)
903	PNO9M	HEX NUT M12-1.75
904	P5B1042PF0904	CARRIAGE STOP POST
905	PWO8M	FLAT WASHER 16MM
906	PB187M	HEX BOLT M16-2 X 55 BLK C12.9
907	PCAP06M	CAP SCREW M6-1 X 25
908	PRP90M	ROLL PIN 8 X 30
909	P5B1042PF0909	RACK (SB1042PF, -60PF)
909	P5B1043PF0909	RACK (SB1043PF, -61PF)
909	P5B1045PF0909	RACK (SB1045PF)
909	P5B1059F0909	RACK (SB1059F)
910	P5B1042PF0910	GAP RACK (SB1042PF, -60PF)
910	P5B1043PF0910	GAP RACK (SB1043PF, -61PF)
910	P5B1045PF0910	GAP RACK (SB1045PF)
910	P5B1059F0910	GAP RACK (SB1059F)
911	P5B1042PF0911	LEADSCREW END LOCK NUT
915	P5S03M	SET SCREW M6-1 X 8
916	P51105	THRUST BEARING 51105
917	P5B1042PF0917	SHAFT END BRACKET
918	P5B1042PF0918	LEADSCREW (SB1042PF, -60PF)
918	P5B1043PF0918	LEADSCREW (SB1043PF, -61PF)
918	P5B1045PF0918	LEADSCREW (SB1045PF)
918	P5B1059F0918	LEADSCREW (SB1059F)
919	PK99M	KEY 6 X 6 X 15
920	P5B1042PF0920	SPRING HOUSING
924	P5B1042PF0924	COMPRESSION SPRING
925	PR37M	EXT RETAINING RING 32MM
926	P5B1042PF0926	SHEAR PIN SHROUD
927	P5B1042PF0927	SHEAR PIN
928	P5B1042PF0928	LEADSCREW COLLAR
929	P5B1042PF0929	BRACKET PLUG
930	PLUBE001	TAP-IN BALL OILER 1/4
934	P5B1042PF0934	LOCK COLLAR
935	P5S01M	SET SCREW M6-1 X 10
936	P5B1042PF0936	FEED ROD (SB1042PF, -60PF)
936	P5B1043PF0936	FEED ROD (SB1043PF, -61PF)
936	P5B1045PF0936	FEED ROD (SB1045PF)
936	P5B1059F0936	FEED ROD (SB1059F)

REF	PART #	DESCRIPTION
937	P5S15M	SET SCREW M12-1.75 X 12
938	P5B1042PF0938	SPRING
939	PSTB003	STEEL BALL 3/8
940	PCAP84M	CAP SCREW M10-1.5 X 35
945	PRP33M	ROLL PIN 7 X 50
946	P5B1042PF0946	SPINDLE LEVER BRACKET
947	P5B1042PF0947	STEPPED DOWEL PIN
948	P5B1042PF0948	RIGHT SPINDLE LEVER
949	PCAP01M	CAP SCREW M6-1 X 16
950	P5B1042PF0950	SPINDLE ROD BRACKET
955	P5B1042PF0955	SPRING HOUSING
956	P5B1042PF0956	COMPRESSION SPRING
957	P5B1042PF0957	SPRING CAP
958	PR37M	EXT RETAINING RING 32MM
959	P5B1042PF0959	SPINDLE ROD (SB1042PF, -60PF)
959	P5B1043PF0959	SPINDLE ROD (SB1043PF, -61PF)
959	P5B1045PF0959	SPINDLE ROD (SB1045PF)
959	P5B1059F0959	SPINDLE ROD (SB1059F)
960	P5S20M	SET SCREW M8-1.25 X 8
961	P5B1042PF0961	SPINDLE BRACKET
966	P5B1042PF0966	LEFT SPINDLE LEVER
967	PEC015M	E-CLIP 8MM
968	P5B1042PF0968	PIVOT ARM
969	P5B1042PF0969	CAPTIVE PIN
970	P5S14M	SET SCREW M8-1.25 X 12
971	P5B1042PF0971	LINK ROD
972	P5B1042PF0972	LOCK COLLAR
973	PCAP04M	CAP SCREW M6-1 X 10
974	PCAP01M	CAP SCREW M6-1 X 16
975	P5B1042PF0975	SPINDLE SWITCH BRACKET
976	P5B1042PF0976	SPINDLE SWITCH TM1308
977	P5B1043PF0977	STEPPED SHAFT (SB1043PF, -61PF)
977	P5B1045PF0977	STEPPED SHAFT (SB1045PF)
978	PCAP128M	CAP SCREW M8-1.25X 70
979	P5B1043PF0979	WAY CLAMP (SB1043PF, -61PF)
979	P5B1045PF0979	WAY CLAMP (SB1045PF)
980	P5S09M	SET SCREW M8-1.25 X 20
981	P5B1043PF0981	PLUNGER
982	P5B1043PF0982	CLAMP BLOCK
983	P5S06M	SET SCREW M8-1.25 X 16
984	P5B1043PF0984	ROD SUPPORT (SB1043PF, -61PF)
984	P5B1045PF0984	ROD SUPPORT (SB1045PF)
985	PR12M	EXT RETAINING RING 35MM
986	P5S20M	SET SCREW M8-1.25 X 8
987	P5B1043PF0987	BUSHING

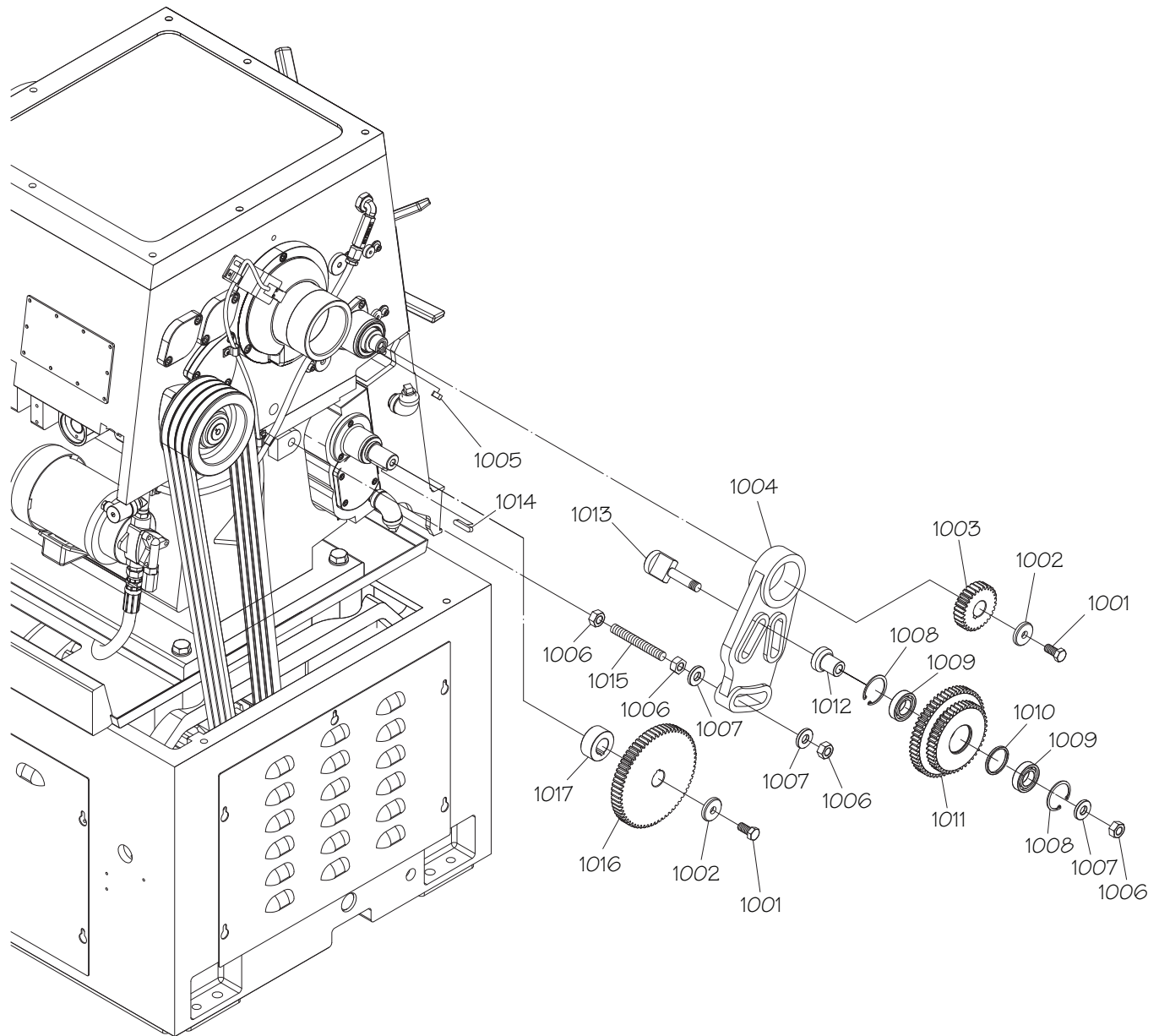
End Gears (SB1042PF, SB1043PF, SB1045PF)



REF	PART #	DESCRIPTION
1001	PB25M	HEX BOLT M12-1.75 X 25
1002	PSB1042PF1002	GEAR FLAT WASHER 12MM
1003	PSB1042PF1003	GEAR 24T
1004	PSB1042PF1004	PIVOT BRACKET
1005	PK166M	KEY 7 X 7 X 15
1006	PN32M	HEX NUT M14-2
1007	PSB1042PF1007	BEARING FLAT WASHER 14MM
1008	PR25M	INT RETAINING RING 47MM
1009	P6005ZZ	BALL BEARING 6005ZZ

REF	PART #	DESCRIPTION
1010	PSB1042PF1010	SPACER
1011	PSB1042PF1011	DOUBLE GEAR 44T/56T
1012	PSB1042PF1012	SHAFT
1013	PSB1042PF1013	SHAFT
1014	PK109M	KEY 7 X 7 X 35
1015	PSB1042PF1015	STUD-FT M14-2 X 110
1016	PSB1042PF1016	GEAR 57T
1017	PSB1042PF1017	SPACER

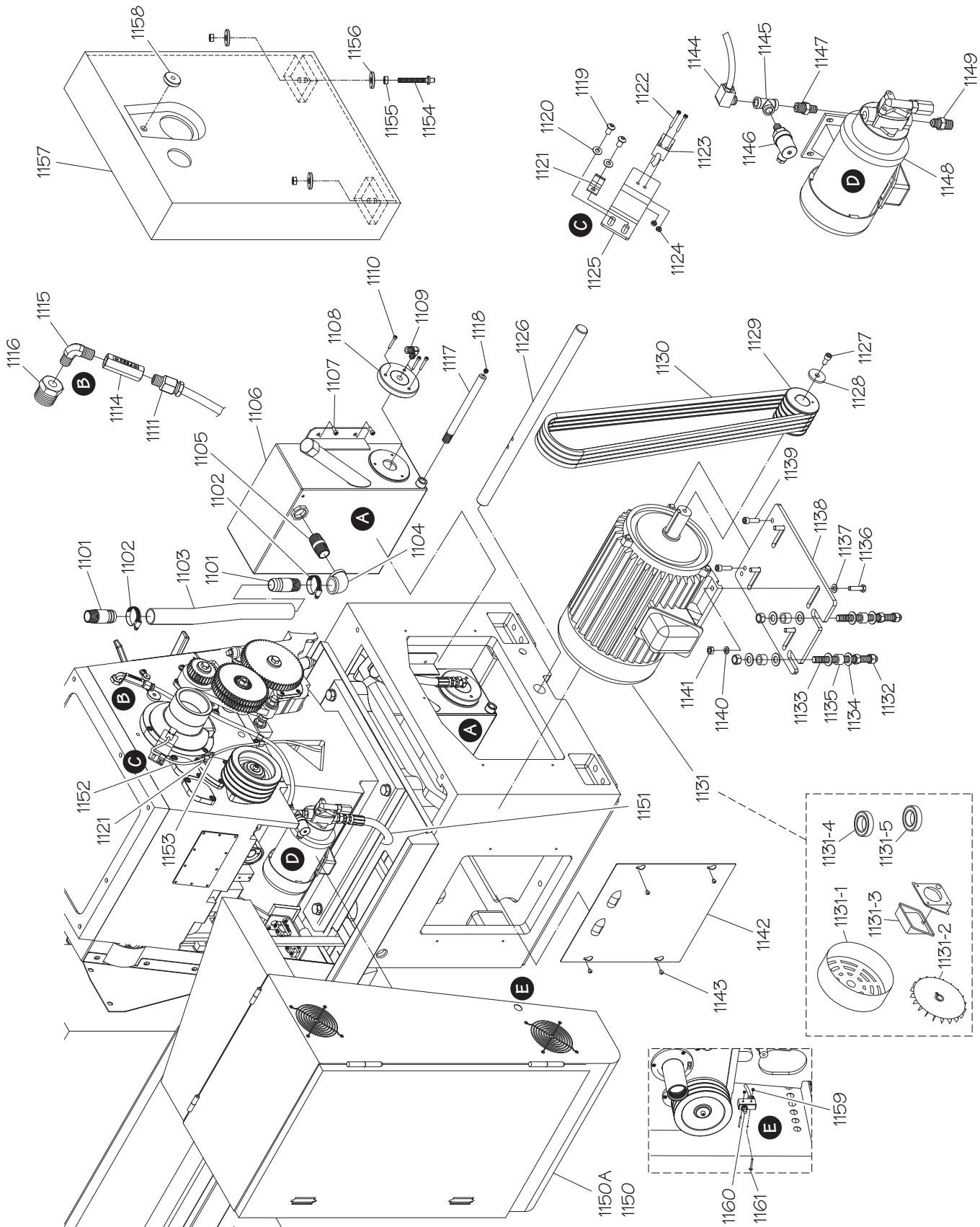
End Gears (SB1059F, SB1060PF, SB1061PF)



REF	PART #	DESCRIPTION
1001	PB25M	HEX BOLT M12-1.75 X 25
1002	PSB1042PF1002	GEAR FLAT WASHER 12MM
1003	PSB1059F1003	GEAR 24T
1004	PSB1059F1004	PIVOT BRACKET
1005	PK166M	KEY 7 X 7 X 15
1006	PN32M	HEX NUT M14-2
1007	PSB1042PF1007	BEARING FLAT WASHER 14MM
1008	PR25M	INT RETAINING RING 47MM
1009	P6005ZZ	BALL BEARING 6005ZZ

REF	PART #	DESCRIPTION
1010	PSB1042PF1010	SPACER
1011	PSB1059F1011	DOUBLE GEAR 44T/56T
1012	PSB1042PF1012	SHAFT
1013	PSB1042PF1013	SHAFT
1014	PK109M	KEY 7 X 7 X 35
1015	PSB1042PF1015	STUD-FT M14-2 X 110
1016	PSB1059F1016	GEAR 57T
1017	PSB1042PF1017	SPACER

Motor & Headstock Oil System

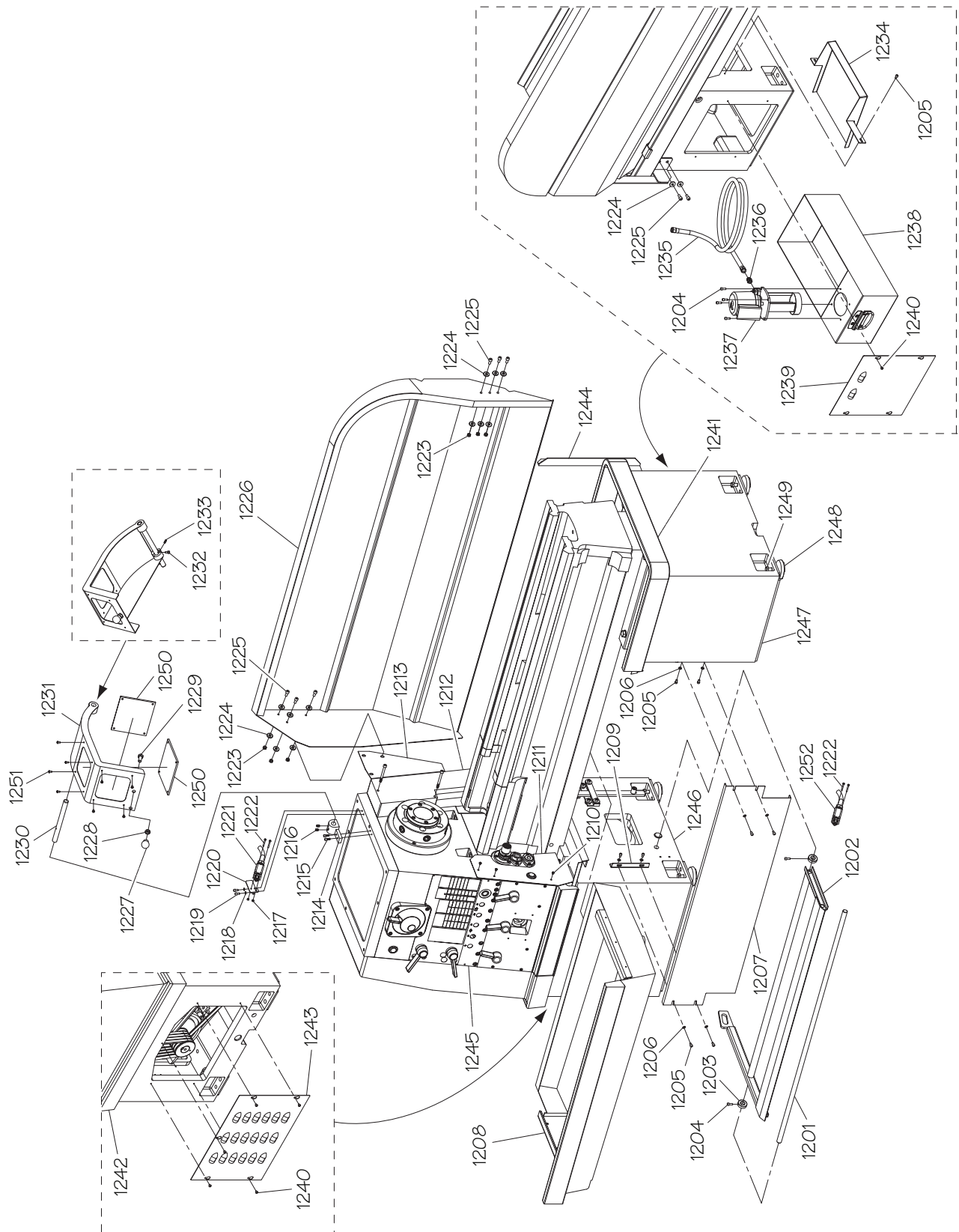


Motor & Headstock Oil System Parts List

REF	PART #	DESCRIPTION
1101	PSB1042PF1101	PIPE ADAPTER 1" NPT X 75MM
1102	PSB1042PF1102	HOSE CLAMP 1"
1103	PSB1042PF1103	OIL HOSE
1104	PSB1042PF1104	PIPE ELBOW 1" NPT
1105	PSB1042PF1105	PIPE ADAPTER 1" NPT X 60MM
1106	PSB1042PF1106	OIL TANK
1107	PCAP11M	CAP SCREW M8-1.25 X 16
1108	PSB1042PF1108	TANK PLATE
1109	PSB1042PF1109	PIPE ELBOW 5/8" NPT X 1/2" NPT
1110	PB151M	HEX BOLT M5-.8 X 35
1111	PSB1042PF1111	PIPE ADAPTER 1/4" NPT
1114	PSB1042PF1114	CHECK VALVE
1115	PSB1042PF1115	PIPE ELBOW 1/4" NPT x 1/4" NPT
1116	PSB1042PF1116	PIPE ADAPTER 3/4" NPT X 1/2" NPT
1117	PSB1042PF1117	DRAIN PIPE 1/4" NPT
1118	PSB1042PF1118	PIPE PLUG 1/4" NPT
1119	PS68M	PHLP HD SCR M6-1 X 10
1120	PWO3M	FLAT WASHER 6MM
1121	PSB1042PF1121	CORD CLIP 10MM
1122	PS98M	PHLP HD SCR M3-.5 X 16
1123	PSB1042PF1123	SPINDLE SPEED SENSOR
1124	PNO7M	HEX NUT M3-.5
1125	PSB1042PF1125	SENSOR BRACKET
1126	PSB1042PF1126	MOTOR MOUNT SHAFT
1127	PCAP64M	CAP SCREW M10-1.5 X 25
1128	PSB1042PF1128	MOTOR PULLEY FLAT WASHER 10MM
1129	PSB1042PF1129	MOTOR PULLEY
1130	PVA78	V-BELT A78 (SB1042PF, -43PF, -45PF)
1130	PVA75	V-BELT A75 (SB1059F, -60PF, -61PF)
1131	PSB1042PF1131	MOTOR 12.5HP 440V 3PH (SB1042PF-61PF)
1131	PSB1059F1131	MOTOR 10HP 440V 3PH (SB1059F)
1131-1	PSB1042PF1131-1	MOTOR FAN COVER (SB1042PF-61PF)
1131-1	PSB1059F1131-1	MOTOR FAN COVER ((SB1059F)
1131-2	PSB1042PF1131-2	MOTOR FAN (SB1042PF-61PF)
1131-2	PSB1059F1131-2	MOTOR FAN (SB1059F)
1131-3	PSB1042PF1131-3	MOTOR JUNCTION BOX (SB1042PF-61PF)

REF	PART #	DESCRIPTION
1131-3	PSB1059F1131-3	MOTOR JUNCTION BOX (SB1059F)
1131-4	PSB1042PF1131-4	FRONT MOTOR BEARING (SB1042PF-61PF)
1131-4	PSB1059F1131-4	FRONT MOTOR BEARING (SB1059F)
1131-5	PSB1042PF1131-5	REAR MOTOR BEARING (SB1042PF-61PF)
1131-5	PSB1059F1131-5	REAR MOTOR BEARING (SB1059F)
1132	PN13M	HEX NUT M16-2
1133	PSB1042PF1133	STUD-FT M16-2 X 170
1134	PWO8M	FLAT WASHER 16MM
1135	PSB1042PF1135	MOTOR MOUNT CUSHION RUBBER
1136	PB180M	HEX BOLT M10-1.5 X 40 BLK
1137	PWO4M	FLAT WASHER 10MM
1138	PSB1042PF1138	MOTOR MOUNT PLATE
1139	PCAP64M	CAP SCREW M10-1.5 X 25
1140	PLWO6M	LOCK WASHER 10MM
1141	PNO2M	HEX NUT M10-1.5
1142	PSB1042PF1142	REAR MOTOR ACCESS COVER
1143	PS14M	PHLP HD SCR M6-1 X 12
1144	PSB1042PF1144	PIPE ADAPTER 3/8 NPT X M16-2
1145	PSB1042PF1145	PIPE T-JOINT 1/4" NPT
1146	PSB1042PF1146	OIL PRESSURE SAFETY SWITCH
1147	PSB1042PF1147	PIPE ADAPTER 3/8" NPT X 1/4" NPT
1148	PSB1042PF1148	OIL PUMP MOTOR 1/4HP 440V 3PH 60HZ
1149	PSB1042PF1149	PIPE ADAPTER 3/8" NPT X 1/2" NPT
1150A	PSB1142PF1150A	ELECTRICAL CABINET ASSEMBLY
1150	PSB1042PF1150	ELECTRICAL CABINET EMPTY
1151	PSB1042PF1151	OIL TUBE 1/2"
1152	PSB1042PF1152	OIL TUBE 10MM
1153	PS05M	PHLP HD SCR M5-.8 X 8
1154	PSB1042PF1154	END GEAR COVER ALIGNMENT PIN
1155	PNO2M	HEX NUT M10-1.5
1156	PWO4M	FLAT WASHER 10MM
1157	PSB1042PF1157	END GEAR COVER
1158	PSB1042PF1158	KNURLED NUT
1159	PNO4M	HEX NUT M4-.7
1160	PSB1042PF1160	END COVER SAFETY SWITCH TM1307
1161	PS65M	PHLP HD SCR M4-.7 X 40

Stand & Panels (SB1042PF-43PF, SB1059F-61PF)



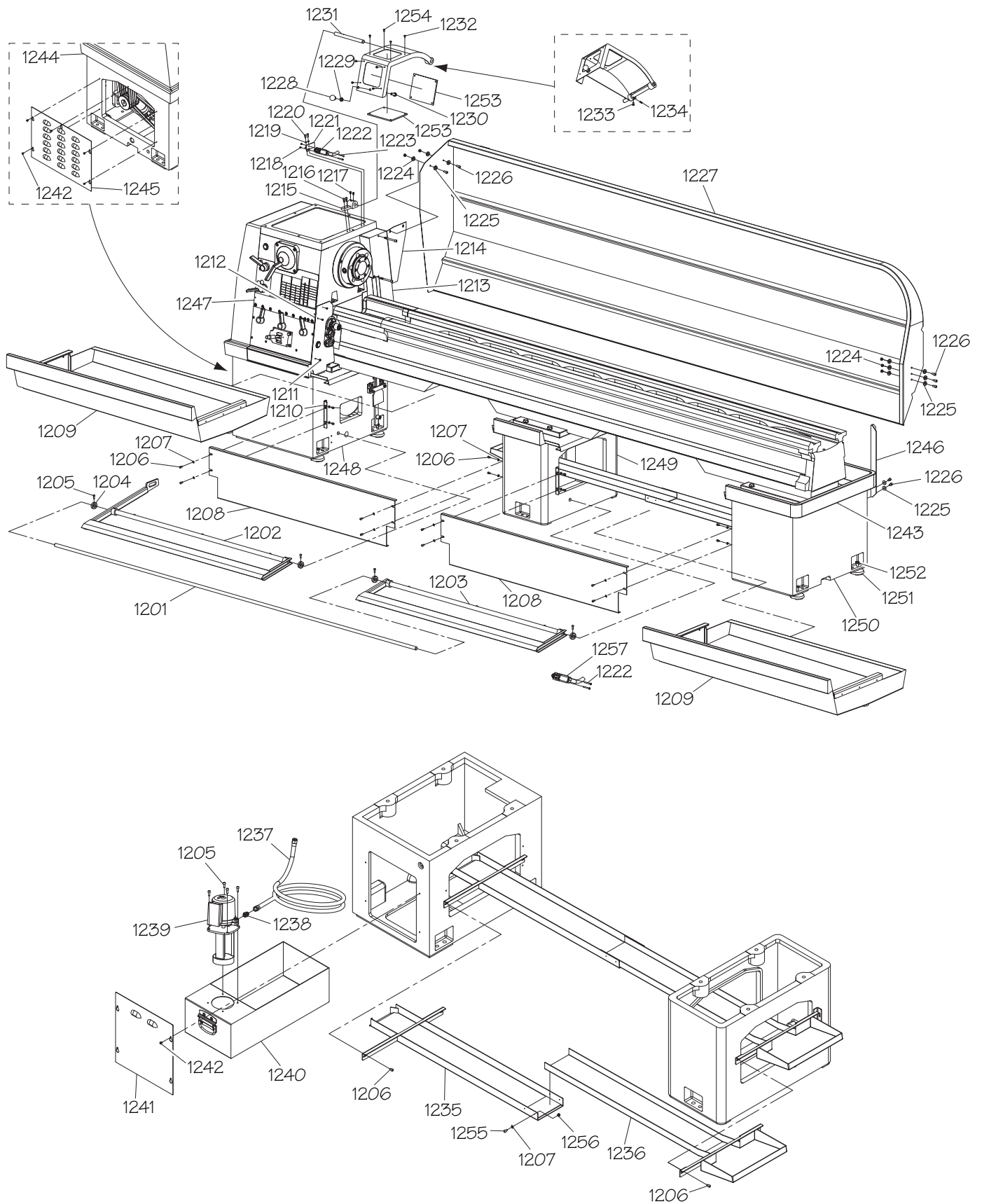
Stand & Panels Parts List

(SB1042PF-43PF, SB1059F-61PF)

REF	PART #	DESCRIPTION
1201	PSB1042PF1201	BRAKE PEDAL ROD (SB1042PF, -60PF)
1201	PSB1043PF1201	BRAKE PEDAL ROD (SB1043PF, -61PF)
1201	PSB1059F1201	BRAKE PEDAL ROD (SB1059F)
1202	PSB1042PF1202	BRAKE PEDAL (SB1042PF, -60PF)
1202	PSB1043PF1202	BRAKE PEDAL (SB1043PF, -61PF)
1202	PSB1059F1202	BRAKE PEDAL (SB1059F)
1203	PSB1042PF1203	LOCK COLLAR
1204	PCAP01M	CAP SCREW M6-1 X 16
1205	PCAP04M	CAP SCREW M6-1 X 10
1206	PWO3M	FLAT WASHER 6MM
1207	PSB1042PF1207	FRONT CABINET PANEL (SB1042PF, -60PF)
1207	PSB1043PF1207	FRONT CABINET PANEL (SB1043PF, -61PF)
1207	PSB1059F1207	FRONT CABINET PANEL (SB1059F)
1208	PSB1042PF1208	CHIP TRAY (SB1042PF, -60PF)
1208	PSB1043PF1208	CHIP TRAY (SB1043PF, -61PF)
1208	PSB1059F1208	CHIP TRAY (SB1059F)
1209	PSB1042PF1209	PANEL BRACKET
1210	PSO5M	PHLP HD SCR M5-.8 X 8
1211	PSB1042PF1211	CLUTCH SIDE COVER (SB1042PF, -43PF)
1211	PSB1059F1211	CLUTCH SIDE COVER (SB1059F, -60PF, -61PF)
1212	PSB1042PF1212	BRAKE COVER
1213	PSB1042PF1213	CONNECTING PANEL (SB1042PF, -43PF)
1213	PSB1059F1213	CONNECTING PANEL (SB1059F, -60PF, -61PF)
1214	PSB1042PF1214	CHUCK GUARD PIVOT ROD BRACKET
1215	PB56M	CAP SCREW M10-1.5 X 20
1216	PS514M	SET SCREW M8-1.25 X 12
1217	PNO4M	HEX NUT M4-.7
1218	PLW03M	LOCK WASHER 6MM
1219	PCAP26M	CAP SCREW M6-1 X 12
1220	PSB1042PF1220	SAFETY SWITCH BRACKET
1221	PSB1042PF1221	CHUCK GUARD SAFETY SWITCH TZ9212
1222	PS65M	PHLP HD SCR M4-.7 X 40
1223	PNO3M	HEX NUT M8-1.25
1224	PWO1M	FLAT WASHER 8MM

REF	PART #	DESCRIPTION
1225	PCAP14M	CAP SCREW M8-1.25 X 20
1226	PSB1042PF1226	BACKSPLASH PANEL (SB1042PF, -60PF)
1226	PSB1043PF1226	BACKSPLASH PANEL (SB1043PF, -61PF)
1226	PSB1059F1226	BACKSPLASH PANEL (SB1059F)
1227	PSB1042PF1227	KNOB 1/2-13
1228	PNO6	HEX NUT 1/2-13
1229	PB107	HEX BOLT 1/2-20 X 1 BLK
1230	PSB1042PF1230	PIVOT ROD
1231	PSB1042PF1231	CHUCK GUARD FRAME
1232	PCAP26M	CAP SCREW M6-1 X 12
1233	PS534M	SET SCREW M5-.8 X 16
1234	PSB1042PF1234	CATCH TRAY
1235	PSB1042PF1235	COOLANT HOSE 3/8" X 78" (SB1042PF, -60PF)
1235	PSB1043PF1235	COOLANT HOSE 3/8" X 96" (SB1043PF, -61PF)
1235	PSB1059F1235	COOLANT HOSE 3/8" X 72" (SB1059F)
1236	PSB1042PF1236	PIPE ADAPTER 3/8" NPT X 3/8" PH
1237	PSB1042PF1237	COOLANT PUMP ASSEMBLY
1238	PSB1042PF1238	COOLANT TANK
1239	PSB1042PF1239	COOLANT TANK ACCESS COVER
1240	PS68M	PHLP HD SCR M6-1 X 10
1241	PSB1042PF1241	RIGHT CABINET TOP COVER (SB1042PF, -60PF)
1241	PSB1043PF1241	RIGHT CABINET TOP COVER (SB1043PF, -61PF)
1241	PSB1059F1241	RIGHT CABINET TOP COVER (SB1059F)
1242	PSB1042PF1242	LEFT CABINET TOP COVER
1243	PSB1042PF1243	MOTOR SIDE ACCESS COVER
1244	PSB1042PF1244	BACKSPLASH PANEL BRACKET
1245	PSB1042PF1245	CONTROL PANEL PLATE
1246	PSB1042PF1246	LEFT CABINET
1247	PSB1042PF1247	RIGHT CABINET
1248	PSB1042PF1248	FOOT PAD CAST-IRON
1249	PB188M	HEX BOLT M16-2 X 60 BLK C12.9
1250	PSB1042PF1250	CHUCK GUARD WINDOW PLASTIC
1251	PS14M	PHLP HD SCR M6-1 X 12
1252	PSB1042PF1252	BRAKE SWITCH

Stand & Panels (SB1045PF)

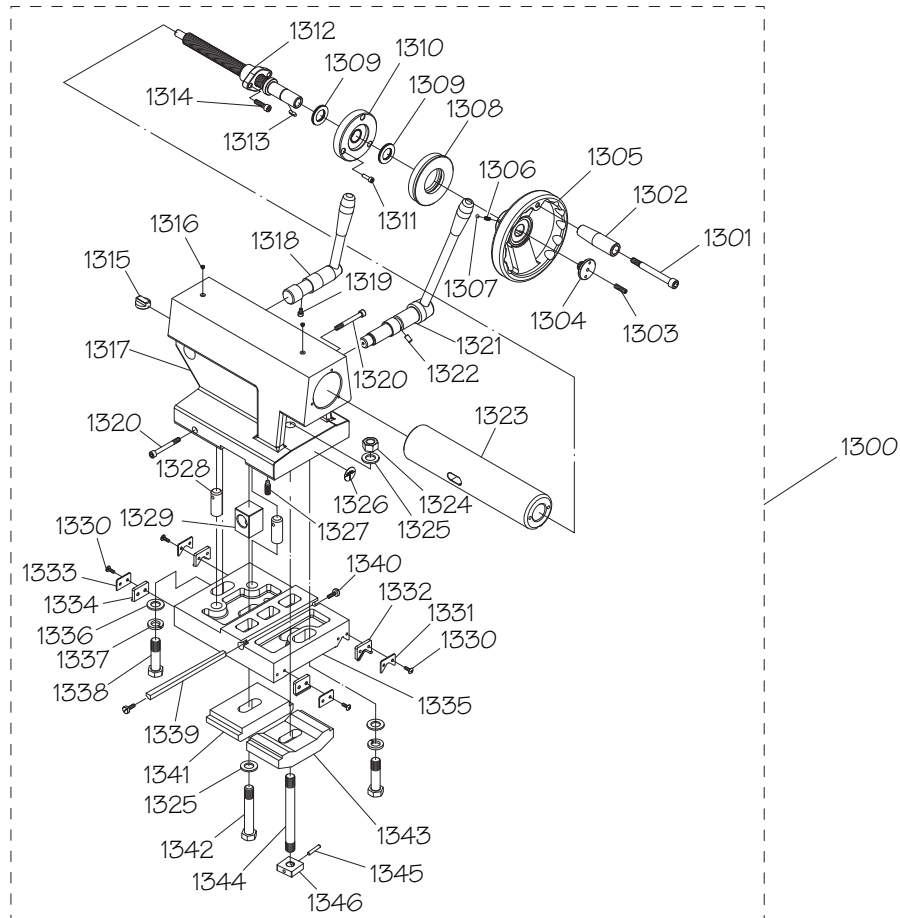


Stand & Panels Parts List (SB1045PF)

REF	PART #	DESCRIPTION
1201	PSB1045PF1201	BRAKE PEDAL ROD
1202	PSB1045PF1202	LEFT BRAKE PEDAL
1203	PSB1045PF1203	RIGHT BRAKE PEDAL
1204	PSB1045PF1204	LOCK COLLAR
1205	PCAP01M	CAP SCREW M6-1 X 16
1206	PCAP04M	CAP SCREW M6-1 X 10
1207	PWO3M	FLAT WASHER 6MM
1208	PSB1045PF1208	FRONT CABINET PANEL
1209	PSB1045PF1209	CHIP TRAY
1210	PSB1045PF1210	PANEL BRACKET
1211	PS05M	PHLP HD SCR M5-.8 X 8
1212	PSB1045PF1212	CLUTCH COVER
1213	PSB1045PF1213	BRAKE COVER
1214	PSB1045PF1214	CONNECTING PLATE
1215	PSB1042PF1214	CHUCK GUARD PIVOT ROD BRACKET
1216	PCAP61M	CAP SCREW M10-1.5 X 20
1217	PS014M	SET SCREW M8-1.25 X 12
1218	PNO4M	HEX NUT M4-.7
1219	PLW03M	LOCK WASHER 6MM
1220	PCAP26M	CAP SCREW M6-1 X 12
1221	PSB1042PF1220	LIMIT SWITCH BRACKET
1222	PSB1042PF1221	CHUCK GUARD LIMIT SWITCH
1223	PS05M	PHLP HD SCR M4-.7 X 40
1224	PNO3M	HEX NUT M8-1.25
1225	PWO1M	FLAT WASHER 8MM
1226	PCAP14M	CAP SCREW M8-1.25 X 20
1227	PSB1045PF1227	BACKSPLASH PANEL
1228	PSB1042PF1227	KNOB 1/2-13
1229	PNO6	HEX NUT 1/2-13

REF	PART #	DESCRIPTION
1230	PB107	HEX BOLT 1/2-20 X 1 BLK
1231	PSB1042PF1230	PIVOT ROD
1232	PSB1042PF1231	CHUCK GUARD FRAME
1233	PCAP26M	CAP SCREW M6-1 X 12
1234	PS034M	SET SCREW M5-.8 X 16
1235	PSB1045PF1235	LOWER CATCH TRAY
1236	PSB1045PF1236	UPPER CATCH TRAY
1237	PSB1045PF1237	COOLANT HOSE 3/8" X 185"
1238	PSB1042PF1236	PIPE ADAPTER 3/8" NPT X 3/8" PH
1239	PSB1042PF1237	COOLANT PUMP ASSEMBLY
1240	PSB1045PF1240	COOLANT TANK
1241	PSB1045PF1241	COOLANT TANK ACCESS COVER
1242	PS068M	PHLP HD SCR M6-1 X 10
1243	PSB1045PF1243	RIGHT CABINET TOP COVER
1244	PSB1045PF1244	LEFT CABINET TOP COVER
1245	PSB1045PF1245	MOTOR SIDE COVER
1246	PSB1045PF1246	BACKSPLASH PANEL BRACKET
1247	PSB1045PF1247	CONTROL PANEL PLATE
1248	PSB1045PF1248	LEFT CABINET
1249	PSB1045PF1249	CENTER CABINET
1250	PSB1045PF1250	RIGHT CABINET
1251	PSB1042PF1248	FOOT PAD CAST-IRON
1252	PB80M	HEX BOLT M16-2 X 55
1253	PSB1042PF1250	CHUCK GUARD WINDOW PLASTIC
1254	PS14M	PHLP HD SCR M6-1 X 12
1255	PCAP01M	CAP SCREW M6-1 X 16
1256	PNO1M	HEX NUT M6-1
1257	PSB1042PF1252	BRAKE SWITCH

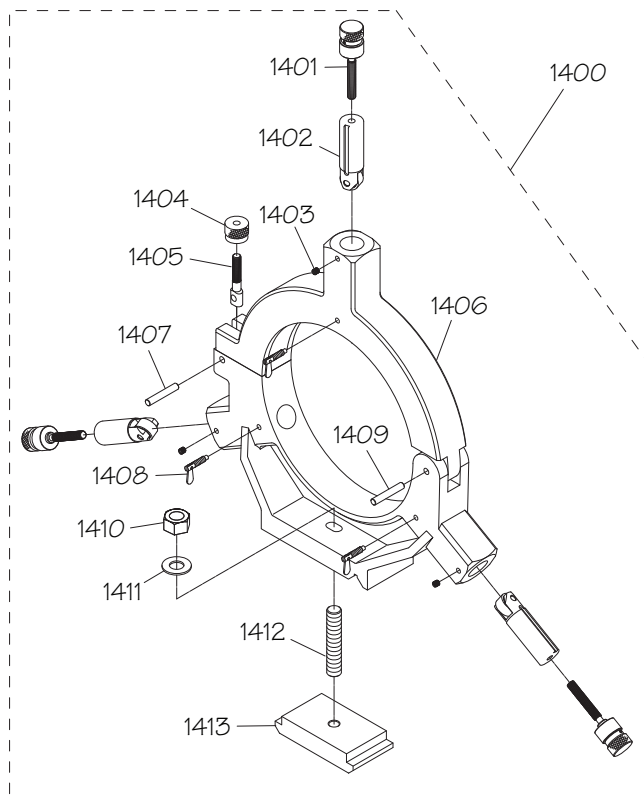
Tailstock



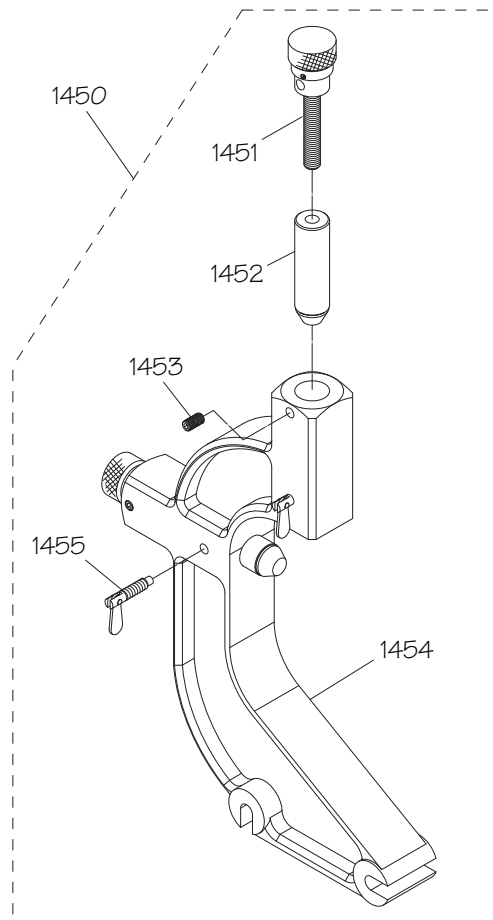
REF	PART #	DESCRIPTION
1300	PSB1042PF1300	TAILSTOCK ASSEMBLY
1301	PSB1042PF1301	HANDLE CAP SCREW
1302	PSB1042PF1302	HANDWHEEL HANDLE
1303	PSG19M	SET SCREW M8-1.25 X 30
1304	PSB1042PF1304	HANDWHEEL RETAINER
1305	PSB1042PF1305	HANDWHEEL
1306	PSB1042PF1306	COMPRESSION SPRING
1307	PSTB001	STEEL BALL 1/4
1308	PSB1042PF1308	GRADUATED DIAL
1309	PSB1042PF1309	THRUST BEARING 3542A52
1310	PSB1042PF1310	LEADSCREW FLANGE
1311	PCAP02M	CAP SCREW M6-1 X 20
1312	PSB1042PF1312	LEADSCREW W/NUT
1313	PK10M	KEY 5 X 5 X 12
1314	PCAP13M	CAP SCREW M8-1.25 X 30
1315	PSB1042PF1315	QUILL ALIGNMENT KEY
1316	PLUBE001	TAP-IN BALL OILER 1/4
1317	PSB1042PF1317	TAILSTOCK CASTING
1318	PSB1042PF1318	QUILL LOCK LEVER ASSEMBLY
1319	PCAP04M	CAP SCREW M6-1 X 10
1320	PCAP128M	CAP SCREW M8-1.25 X 70
1321	PSB1042PF1321	TAILSTOCK LOCK LEVER ASSEMBLY
1322	PSB1042PF1322	DOWEL PIN
1323	PSB1042PF1323	QUILL

REF	PART #	DESCRIPTION
1324	PN29M	HEX NUT M18-2.5
1325	PW18M	FLAT WASHER 18MM
1326	PSB1042PF1326	OFFSET INDICATOR
1327	PSB10161327	DOG POINT SET SCREW M10-1.5 X 30
1328	PSB1042PF1328	ALIGNMENT SHAFT
1329	PSB1042PF1329	PIVOT BLOCK
1330	PS40M	PHLP HD SCR M5-.8 X 16
1331	PSB1042PF1331	V-WIPER PLATE
1332	PSB1042PF1332	V-WIPER
1333	PSB1042PF1333	STRAIGHT WIPER PLATE
1334	PSB1042PF1334	STRAIGHT WIPER
1335	PSB1042PF1335	TAILSTOCK BASE
1336	PW18M	FLAT WASHER 18MM
1337	PLW12M	LOCK WASHER 18MM
1338	PB181M	HEX BOLT M18-2.5 X 50
1339	PSB1042PF1339	GIB
1340	PSB1042PF1340	GIB SCREW
1341	PSB1042PF1341	LEFT CLAMP BLOCK
1342	PB178M	HEX BOLT M18-2.5 X 110
1343	PSB1042PF1343	RIGHT CLAMP BLOCK
1344	PSB1042PF1344	STUD-DE M18-2.5 X 150 20/30
1345	PRP31M	ROLL PIN 6 X 36
1346	PSB1042PF1346	SQUARE LOCK NUT M18-2.5

Steady Rest



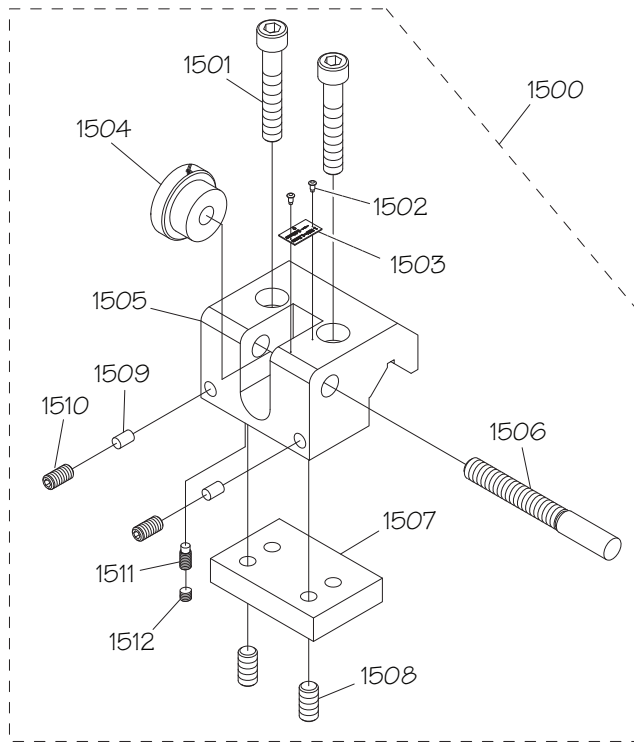
Follow Rest



REF	PART #	DESCRIPTION
1400	PSB1042PF1400	STEADY REST ASSEMBLY
1401	PSB1042PF1401	ADJUSTMENT KNOB BOLT ASSEMBLY
1402	PSB1042PF1402	FINGER ASSEMBLY W/627 BEARING
1403	PSS20M	SET SCREW M8-1.25 X 8
1404	PSB1042PF1404	KNURLED KNOB
1405	PSB1042PF1405	CLAMP BOLT
1406	PSB1042PF1406	STEADY REST CASTING 2PC
1407	PSB1042PF1407	DOWEL PIN
1408	PSB1042PF1408	DOG POINT LEAF SCREW
1409	PSB1042PF1409	HINGE PIN
1410	PN29M	HEX NUT M18-2.5
1411	PLW12M	LOCK WASHER 18MM
1412	PSB1042PF1412	STUD-FT M18-2.5 X 110
1413	PSB1042PF1413	CLAMP PLATE

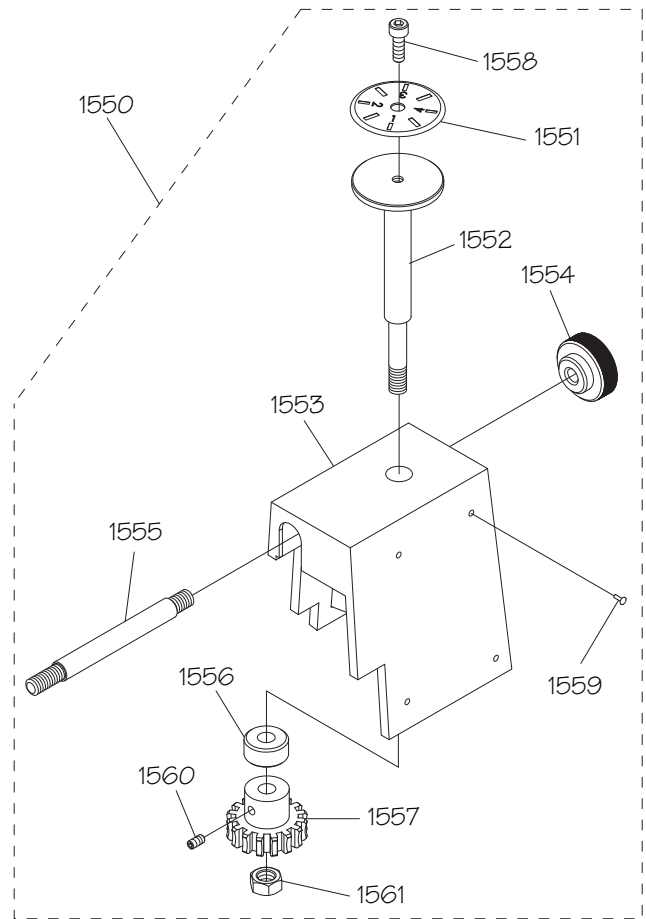
REF	PART #	DESCRIPTION
1450	PSB1042PF1450	FOLLOW REST ASSEMBLY
1451	PSB1042PF1451	ADJUSTMENT KNOB BOLT ASSEMBLY
1452	PSB1042PF1452	FINGER ASSEMBLY
1453	PSS06M	SET SCREW M8-1.25 X 16
1454	PSB1042PF1454	FOLLOW REST CASTING
1455	PSB1042PF1408	DOG POINT LEAF SCREW

Micrometer Stop



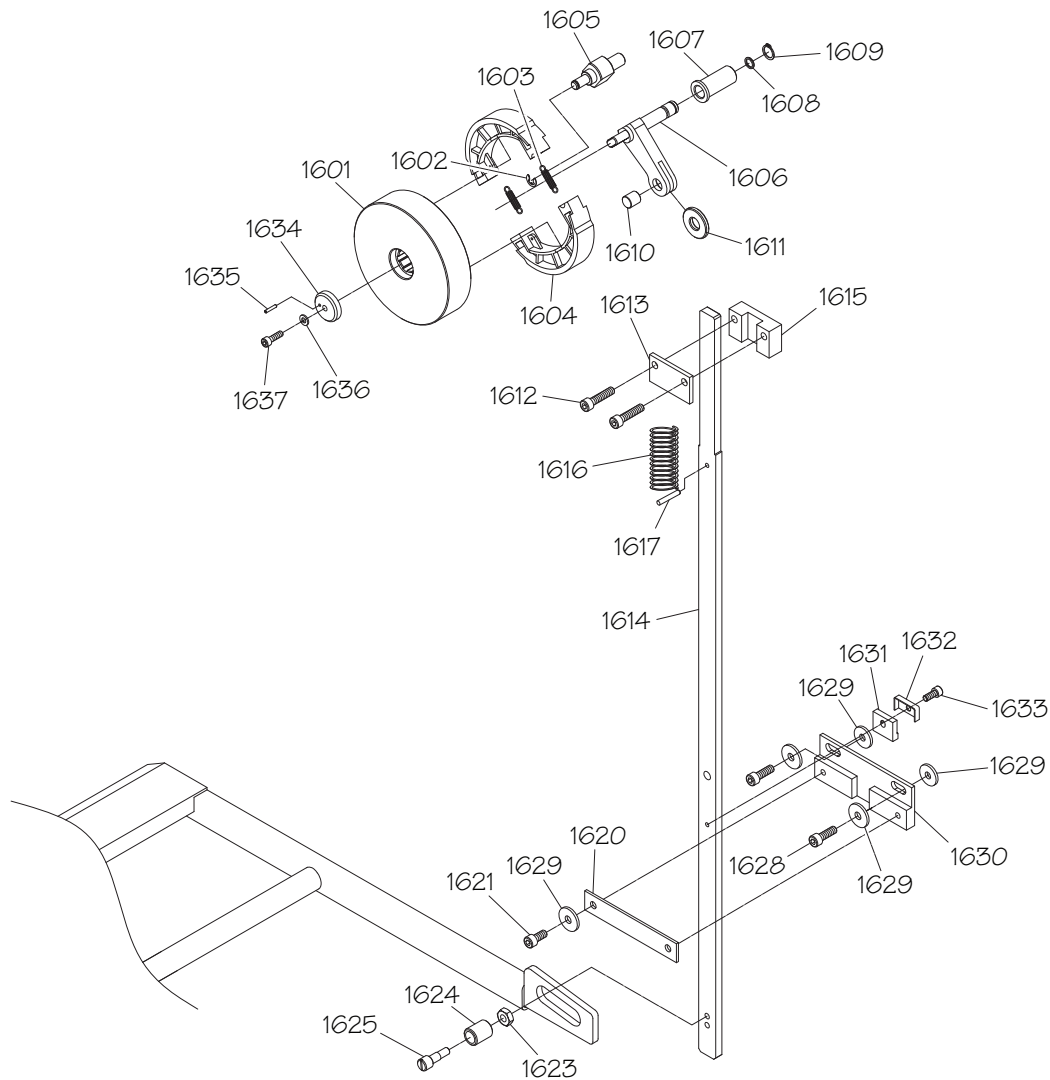
REF	PART #	DESCRIPTION
1500	PSB1042PF1500	MICROMETER STOP ASSEMBLY
1501	PCAP71M	CAP SCREW M10-1.5 X 60
1502	PRIV002M	COPPER FLUTED RIVET 2 X 5MM
1503	PSB1042PF1503	INDICATOR PLATE
1504	PSB1042PF1504	ADJUSTMENT KNOB
1505	PSB1042PF1505	MICROMETER BODY
1506	PSB1042PF1506	STOP ROD
1507	PSB1042PF1507	CLAMP PLATE
1508	PSS10M	SET SCREW M10-1.5 X 20
1509	PSB1042PF1509	PLUNGER COPPER
1510	PSS06M	SET SCREW M8-1.25 X 16
1511	PSB10161461	DOG POINT SET SCREW M8-1.25 X 12
1512	PSS14M	SET SCREW M8-1.25 X 12

Thread Dial



REF	PART #	DESCRIPTION
1550	PSB1042PF1550	THREAD DIAL ASSEMBLY
1551	PSB1042PF1551	THREAD DIAL
1552	PSB1042PF1552	DIAL SHAFT
1553	PSB1042PF1553	THREAD DIAL BODY
1554	PSB1042PF1554	ADJUSTMENT KNOB
1555	PSB1042PF1555	STUD-DE M10-1.5 X 120 20/40
1556	PSB1042PF1556	SPACER
1557	PSB1042PF1557	THREAD DIAL GEAR 16T
1558	PSB1042PF1558	THREAD DIAL CAP SCREW
1559	PRIV002M	COPPER FLUTED RIVET 2 X 5MM
1560	PSS02M	SET SCREW M6-1 X 6
1561	PSB1042PF1561	DIAL SHAFT HEX NUT

Brake

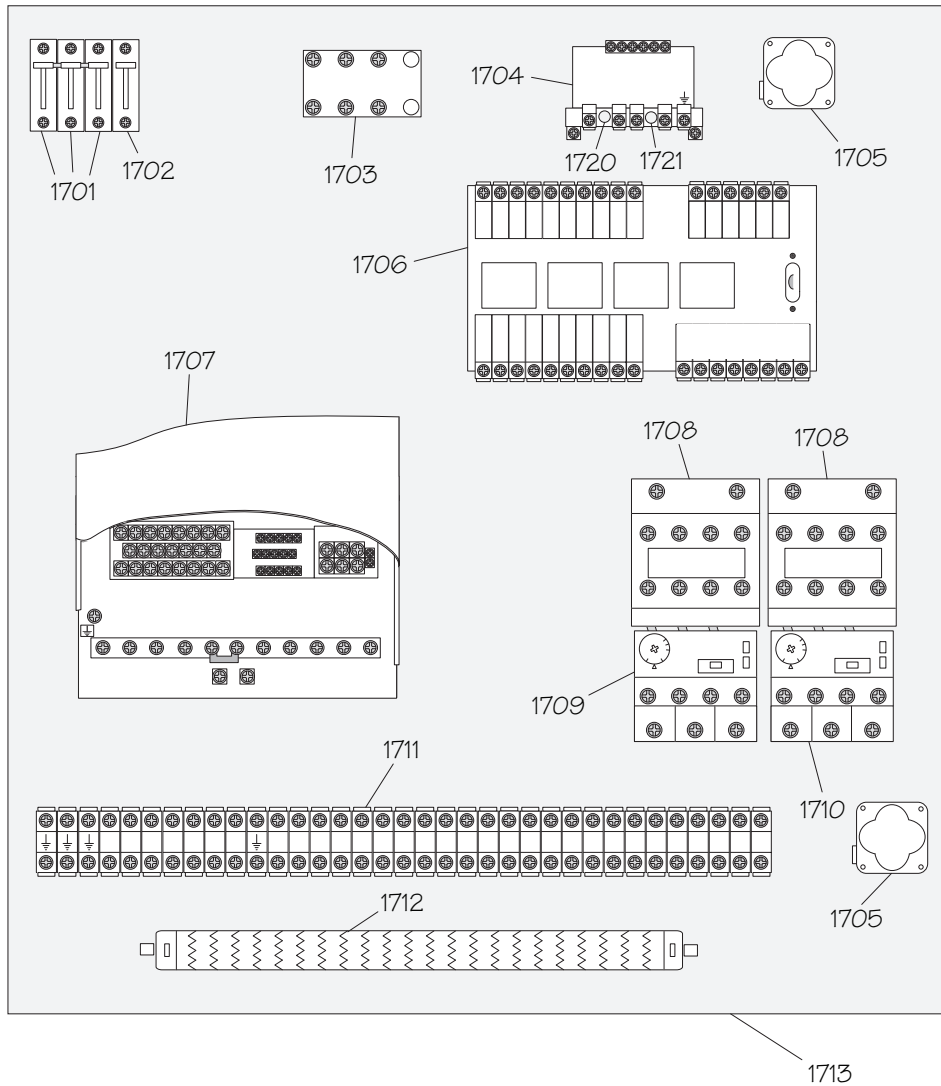


REF	PART #	DESCRIPTION
1601	PSB1042PF1601	BRAKE DRUM
1602	PECO15M	E-CLIP 8MM
1603	PSB1042PF1603	EXTENSION SPRING
1604	PSB1042PF1604	BRAKE SHOE 2PC
1605	PSB1042PF1605	ECCENTRIC SHAFT
1606	PSB1042PF1606	ROCKER ARM
1607	PSB1042PF1607	BUSHING
1608	PORPO10	O-RING 9.8 X 1.9 P10
1609	PRO2M	EXT RETAINING RING 14MM
1610	PSB1042PF1610	SHAFT
1611	PSB1042PF1611	SPACER
1612	PCAP40M	CAP SCREW M8-1.25 X 35
1613	PSB1042PF1613	UPPER BRACKET MOUNT
1614	PSB1042PF1614	VERTICAL CONNECTING ROD
1615	PSB1042PF1615	UPPER ROD BRACKET
1616	PSB1042PF1616	COMPRESSION SPRING

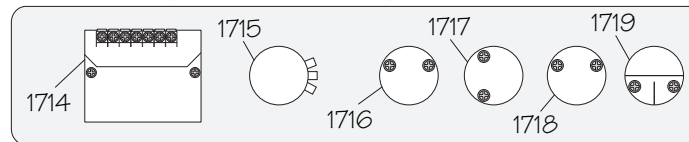
REF	PART #	DESCRIPTION
1617	PSB10161617	DOWEL PIN 5 X 30
1620	PSB1042PF1620	LOWER BRACKET MOUNT
1621	PCAP11M	CAP SCREW M8-1.25 X 16
1623	PSB1042PF1623	STEPPED BOLT THIN NUT
1624	PSB1042PF1624	BUSHING
1625	PSB1042PF1625	STEPPED BOLT
1628	PCAP31M	CAP SCREW M8-1.25 X 25
1629	PWO1M	FLAT WASHER 8MM
1630	PSB1042PF1630	LOWER ROD BRACKET
1631	PSB1042PF1631	STOP BLOCK
1632	PSB1042PF1632	STOP BLOCK COVER
1633	PCAP04M	CAP SCREW M6-1 X 10
1634	PSB1042PF1634	BRAKE DRUM RETAINER
1635	PRPO2M	ROLL PIN 3 X 16
1636	PLWO3M	LOCK WASHER 6MM
1637	PCAP02M	CAP SCREW M6-1 X 20

Electrical Cabinet & Control Panel

Electrical Cabinet



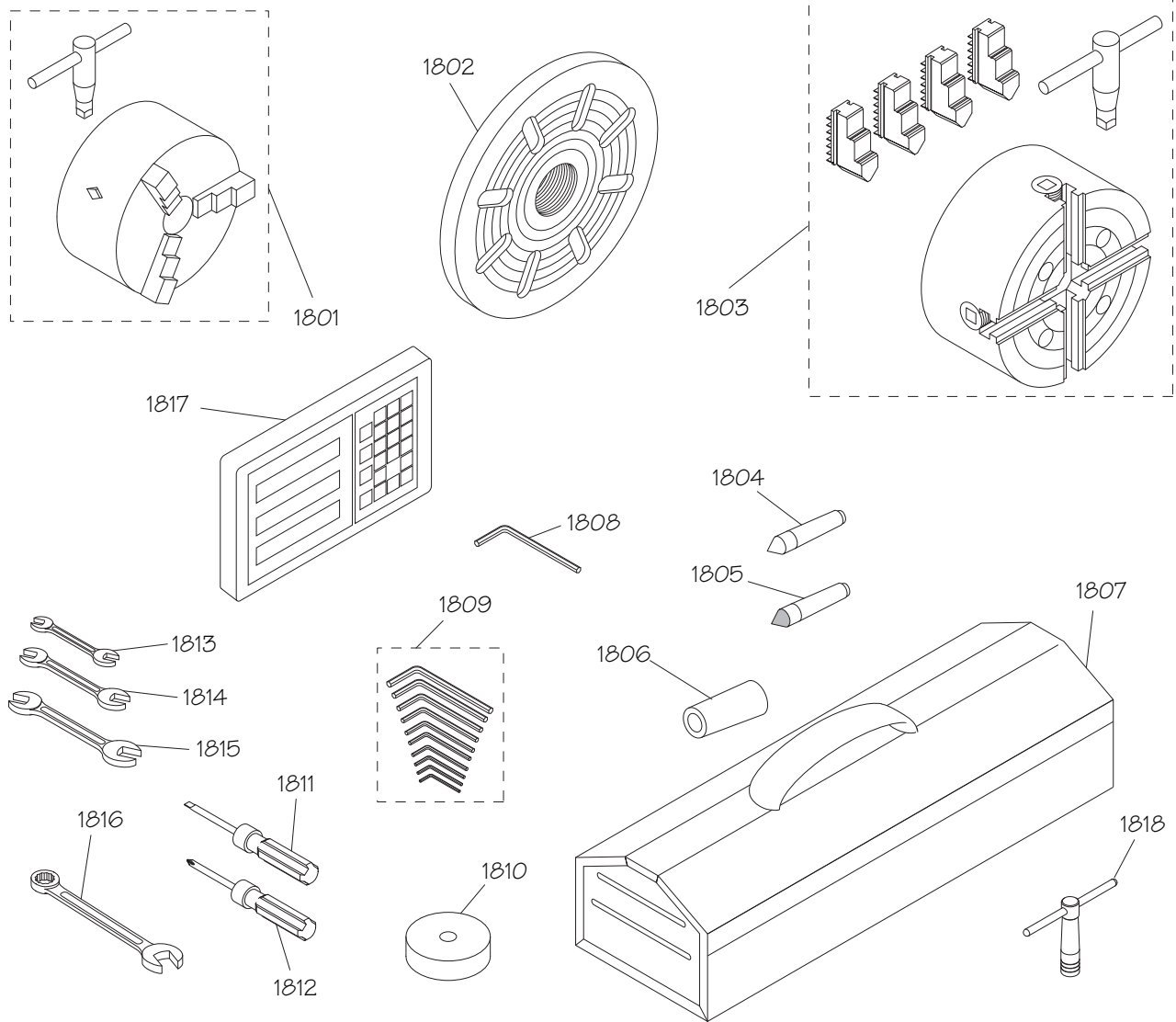
Control Panel (Viewed from Behind)



REF	PART #	DESCRIPTION
1701	PSB1042PF1701	CIRCUIT BREAKER 1492 5P D20-20A
1702	PSB1042PF1702	CIRCUIT BREAKER 1492 5P D6-6A
1703	PSB1042PF1703	MASTER POWER SWITCH
1704	PSB1042PF1704	TRANSFORMER LIANG 5P-TBSW
1705	PSB1042PF1705	COOLING FAN
1706	PSB1042PF1706	CIRCUIT BOARD
1707	PSB1042PF1707	INVERTER YASKAWA VARISPEED G7
1708	PSB1042PF1708	CONTACTOR AB C09400 400V
1709	PSB1042PF1709	OL RELAY AB 193T 0.25-0.4A
1710	PSB1042PF1710	OL RELAY AB 193T 1.8-2.5A
1711	PSB1042PF1711	TERMINAL BOARD 35 POST

REF	PART #	DESCRIPTION
1712	PSB1042PF1712	THERMAL RESISTOR 1600W/350HM
1713	PSB1042PF1713	ELECTRICAL MOUNTING PLATE
1714	PSB1042PF1714	TACHOMETER DISPLAY
1715	PSB1042PF1715	SPINDLE SPEED DIAL
1716	PSB1042PF1716	POWER LAMP
1717	PSB1042PF1717	COOLANT PUMP SWITCH
1718	PSB1042PF1718	JOG BUTTON
1719	PSB1042PF1719	EMERGENCY STOP BUTTON
1720	PSB1042PF1720	FUSE 4A 250V TIME-DELAY 5 X 20MM
1721	PSB1042PF1721	FUSE 0.5A 250V FAST-ACTING 5 X 20MM

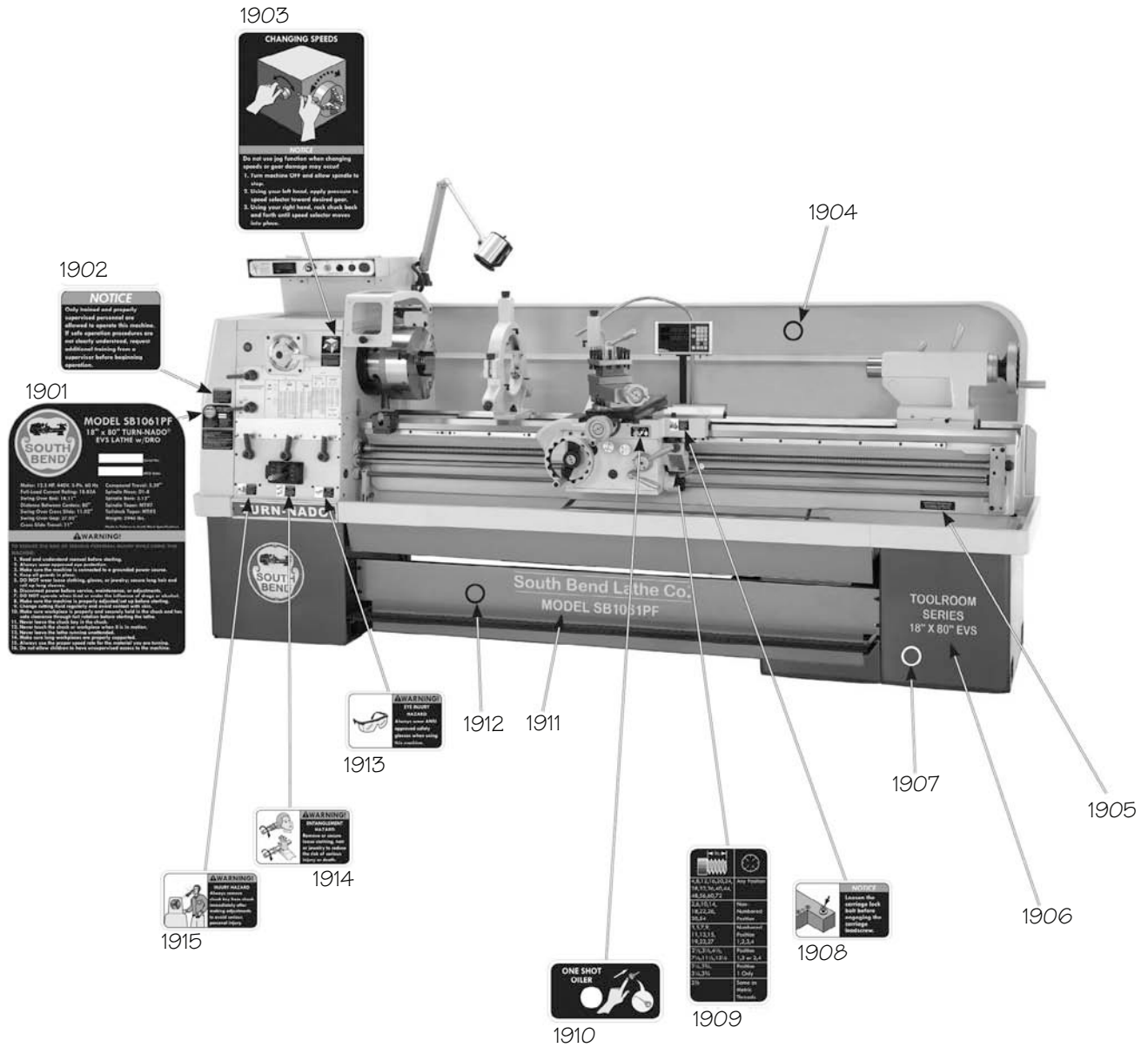
Accessories



REF	PART #	DESCRIPTION
1801	SB1312	3-JAW CHUCK ASSEMBLY 12"
1802	PSB1042PF1802	FACEPLATE ASSEMBLY 14"
1803	SB1232	4-JAW CHUCK ASSEMBLY 14"
1804	PSB1042PF1804	DEAD CENTER MT#5
1805	PSB1042PF1805	DEAD CENTER CARBIDE-TIPPED MT#5
1806	PSB1042PF1806	SPINDLE SLEEVE MT#7-MT#5
1807	PSB1042PF1807	TOOL BOX
1808	PAW10M	HEX WRENCH 10MM
1809	PAW1510M	HEX WRENCH SET 1.5-10MM

REF	PART #	DESCRIPTION
1810	PSB10531710	FOOT CAST-IRON
1811	PSDF2	STANDARD SCREWDRIVER #2
1812	PSDP2	PHILLIPS SCREWDRIVER #2
1813	PWR1012	WRENCH 10/12MM
1814	PWR1417	WRENCH 14/17MM
1815	PWR2224	WRENCH 22/24MM
1816	PWR27	COMBO WRENCH 27MM
1817	PSB10531717	DRO ASSEMBLY FAGOR 201-T 2-AXIS
1818	PSB1042PF1818	4-WAY TOOL POST WRENCH

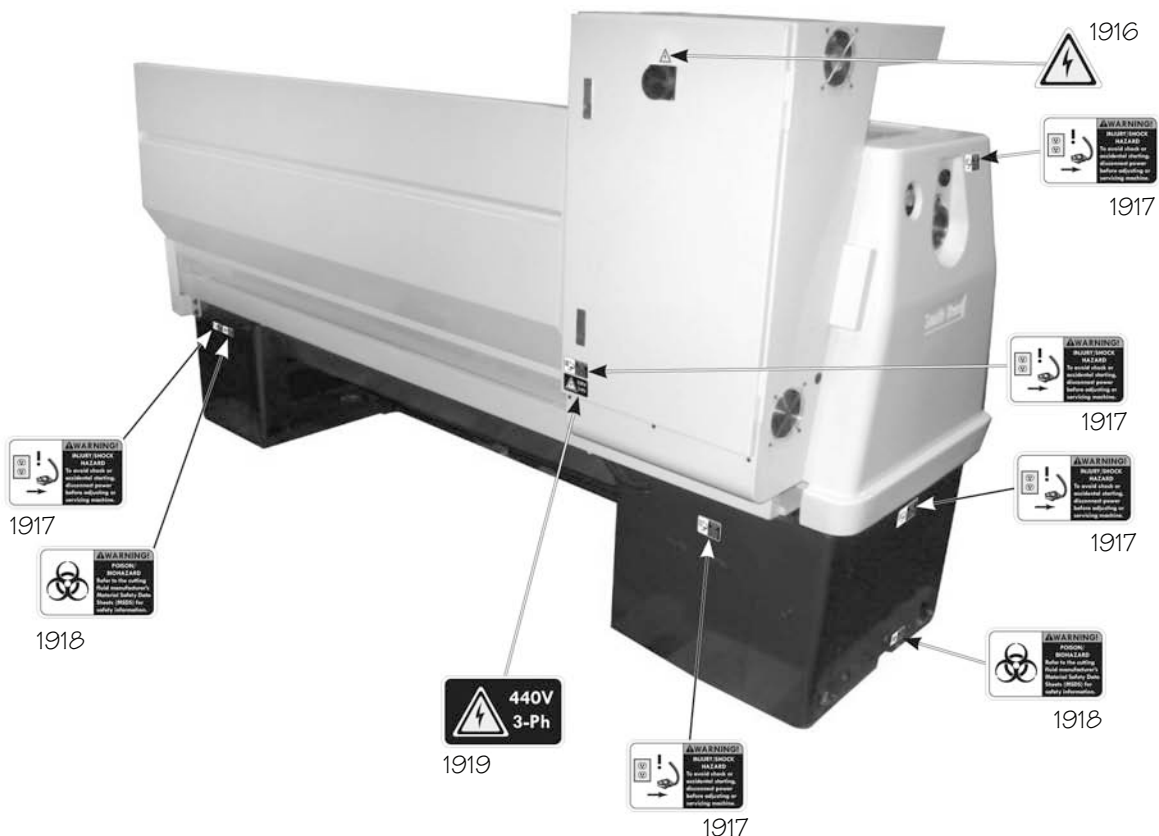
Front Machine Labels



REF	PART #	DESCRIPTION
1901	PSB1042PF1901	MACHINE ID LABEL (SB1042PF)
1901	PSB1043PF1901	MACHINE ID LABEL (SB1043PF)
1901	PSB1045PF1901	MACHINE ID LABEL (SB1045PF)
1901	PSB1059F1901	MACHINE ID LABEL (SB1059F)
1901	PSB1060PF1901	MACHINE ID LABEL (SB1060PF)
1901	PSB1061PF1901	MACHINE ID LABEL (SB1061PF)
1902	PSB1042PF1902	PROPER PERSONNEL NOTICE LABEL
1903	PSB1042PF1903	CHANGING SPEEDS LABEL
1904	PSBPAINT01	SB GRAY TOUCH-UP PAINT
1905	PSB1042PF1905	BEDWAY DESCRIPTION LABEL
1906	PSB1042PF1906	TOOLROOM SERIES LABEL (SB1042PF)
1906	PSB1043PF1906	TOOLROOM SERIES LABEL (SB1043PF)
1906	PSB1045PF1906	TOOLROOM SERIES LABEL (SB1045PF)
1906	PSB1059F1906	TOOLROOM SERIES LABEL (SB1059F)
1906	PSB1060PF1906	TOOLROOM SERIES LABEL (SB1060PF)

REF	PART #	DESCRIPTION
1906	PSB1061PF1906	TOOLROOM SERIES LABEL (SB1061PF)
1907	PSBPAINT03	SB DARK BLUE TOUCH-UP PAINT
1908	PSB1042PF1908	CARRIAGE LOCK NOTICE LABEL
1909	PSB1042PF1909	THREAD DIAL CHART LABEL
1910	PSB1042PF1910	ONE-SHOT OILER LABEL
1911	PSB1042PF1911	LOGO MODEL NUMBER LABEL (SB1042PF)
1911	PSB1043PF1911	LOGO MODEL NUMBER LABEL (SB1043PF)
1911	PSB1045PF1911	LOGO MODEL NUMBER LABEL (SB1045PF)
1911	PSB1059F1911	LOGO MODEL NUMBER LABEL (SB1059F)
1911	PSB1060PF1911	LOGO MODEL NUMBER LABEL (SB1060PF)
1911	PSB1061PF1911	LOGO MODEL NUMBER LABEL (SB1061PF)
1912	PSBPAINT02	SB LIGHT BLUE TOUCH-UP PAINT
1913	PSBLABEL04HL	SAFETY GLASSES LABEL
1914	PSBLABEL08HL	ENTANGLEMENT HAZARD LABEL
1915	PSB1042PF1915	CHUCK KEY HAZARD LABEL

Rear Machine Labels



REF	PART #	DESCRIPTION
1916	PSBLABEL15M	ELECTRICITY LABEL
1917	PSBLABEL02HL	DISCONNECT POWER WARNING LABEL

REF	PART #	DESCRIPTION
1918	PSBLABEL06HL	POISON/BIOHAZARD LABEL
1919	PSB1042PF1919	440V 3PH LABEL

!WARNING

The safety labels provided with your machine are used to make the operator aware of the machine hazards and ways to prevent injury. The owner of this machine **MUST** maintain the original location and readability of these safety labels. If any label is removed or becomes unreadable, **REPLACE** that label before using the machine again. Contact South Bend Lathe Co. at (360) 734-1540 or www.southbendlathe.com to order new labels.

Warranty

This quality product is warranted by South Bend Lathe Company to the original buyer for one year from the date of purchase. This warranty does not apply to consumable parts, or defects due to any kind of misuse, abuse, negligence, accidents, repairs, alterations or lack of maintenance. We do not reimburse for third party repairs. In no event shall we be liable for death, injuries to persons or property, or for incidental, contingent, special or consequential damages arising from the use of our products.

We do not warrant or represent that this machine complies with the provisions of any law, act, code, regulation, or standard of any domestic or foreign government, industry, or authority. In no event shall South Bend's liability under this warranty exceed the original purchase price paid for this machine. Any legal actions brought against South Bend Lathe Company shall be tried in the State of Washington, County of Whatcom.

This is the sole written warranty for this machine. Any and all warranties that may be implied by law, including any merchantability or fitness, for any purpose, are hereby limited to the duration of this warranty. To take advantage of this warranty, contact us by mail or phone to give us the details of the problem you are having.

Thank you for your business and continued support.



**South Bend Lathe Co.
P.O. Box 2027
Bellingham, WA 98227**

PHONE: (360) 734-1540 (Administrative Offices)

FAX: (360) 676-1075 (International)

FAX: (360) 734-1639 (USA only)

southbendlathe.com

